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Announcements & Index

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NATIONAL TECHNICAL INFORMATION SERVICE ● Joseph F. Caponio, Director

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GOVERNMENT REPORTS

Announcements & Index

Volume 85, Number 6 March 15, 1985

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* Committee on Scientific and Technical Information

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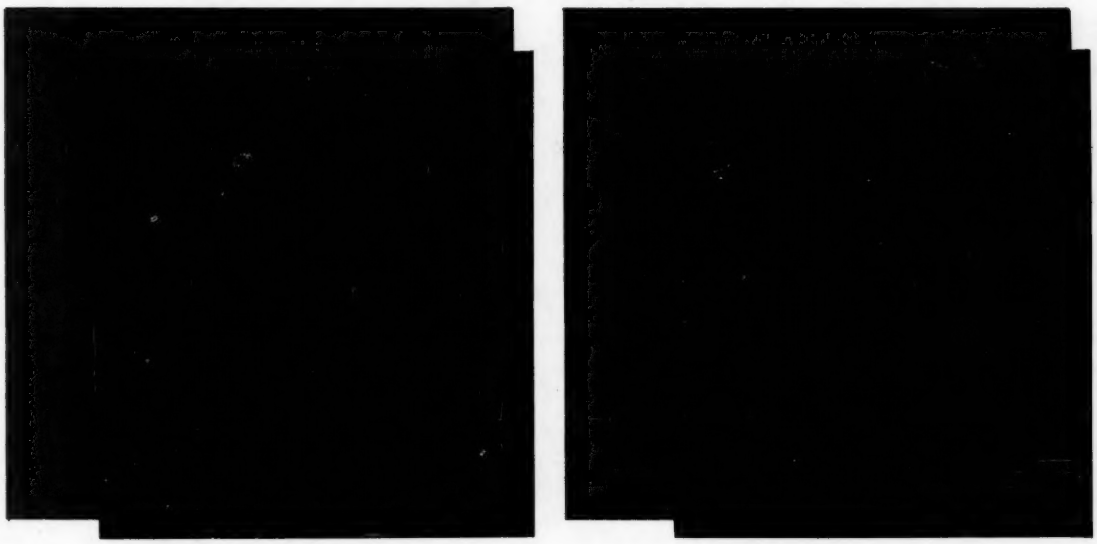

1. AERONAUTICS

1A. Aerodynamics

512,646
AD-A148 704/0/GAR PC **A03**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
International Aviation (Selected Articles),
13 Nov 84, 32p Rept no. FTD-ID(RS)T-0989-84
Edited trans. of Guoji Hang Kong (China) n254 p13-19, 46-47 Apr 84.

No abstract available.

512,647
AD-A148 830/3/GAR PC **A03**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Acta Aeronautica et Astronautica Sinica (Selected Articles),
C. Liu, H. Gao, and Q. X. Gong. 27 Nov 84, 42p
Rept no. FTD-ID(RS)T-1150-84
Edited trans. of Hangkong Xuebao (China) v5 n1 p11-29 1984.

No abstract available.

512,648
DE85002604/GAR PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
LOVEL-84: A LOw-VELocity Aerodynamic Heating Code for Flat Plates, Wedges, and Cones.
A. L. Thornton. May 84, 57p SAND-84-0457
Contract AC04-76DP00789
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The LOVEL computer program calculates the cold-wall heat transfer in subsonic and supersonic flow over wedge and conical (sharp and blunt body) geometries for freestream Mach numbers (M/sub infinity/) less than 6.0. Fluid properties used to compute the cold-wall heat-transfer rates are based on Eckert's reference enthalpy correlation. The first part of this report describes the theory used in the computation of the cold-wall heat-transfer rates; the second part describes in detail the input/output format for the LOVEL computer program. Program output includes freestream conditions, boundary-layer edge conditions, cold-wall heat-transfer rates, plots of heating rates,

and punched-card output for use in ablation and in-depth transient heat-conduction computer codes. (ERA citation 10:003654)

512,649
N85-11976/6/GAR PC$6.00
National Aeronautics and Space Administration, Washington, DC.
Aeronautical Engineering, a Continuing Bibliography with Indexes.
Oct 84, 187p NAS 1.21:7037(179), NASA-SP-7037(179)

This bibliography lists 693 reports, articles and other documents introduced into the NASA scientific and technical information system in September 1984.

512,650
N85-12008/7/GAR PC A03/MF A01
GMAF, Inc., Freeport, NY.
Inverse Design Technique for Cascades.
Final Report.
L. Zannetti, and M. Pandolfi. Nov 84, 33p NAS 1.26:3836, E-2275, NASA-CR-3836
Contract NAS3-22772

A numerical technique to generate cascades is presented. The basic prescribed parameters are: inlet angle, exit pressure, and distribution of blade thickness and lift along a blade. Other sets of parameters are also discussed. The technique is based on the lambda scheme. The problem of stability of the computation as a function of the prescribed set of parameters and the treatment of boundary conditions is discussed. A one dimensional analysis to indicate a possible way for assuring stability for any two dimensional calculation is provided.

512,651
N85-12009/5/GAR PC A07/MF A01
Virginia Polytechnic Inst. and State Univ., Blacksburg.
Lateral-Directional Characteristics of a 74-Degree delta Wing Employing Gothic Planform Vortex Flaps.
A. C. Grantz. Nov 84, 146p NAS 1.26:3848, NASA-CR-3848
Contract NGT-47-004-802

The low speed lateral/directional characteristics of a generic 74 degree delta wing body configuration employing the latest generation, gothic planform vortex flaps was determined. Longitudinal effects are also presented. The data are compared with theoretical estimates from VORSTAB, an extension of the Quasi vortex lattice Method of Lan which empirically accounts for vortex breakdown effects in the calculation of longitudinal and lateral/directional aerodynamic characteristics. It is indicated that leading edge deflections of 30 and 40 degrees reduce the magnitude of the wing effective dihedral relative to the baseline for a specified angle of attack or lift coefficient. For angles of attack greater than 15 degrees, these flap deflections reduce the configuration directional stability despite improved vertical tail effectiveness. It is shown that asymmetric leading edge deflections are inferior to conventional ailerons in generating rolling moments. VORSTAB calculations provide coarse lateral/directional estimates at low to moderate angles of attack. The theory does not account for vortex flow induced, vertical tail effects.

512,652
N85-12037/6/GAR PC A03/MF A01
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Status and Prospects of Computational Fluid Dynamics for Unsteady Transonic Viscous Flows.
W. J. Mccroskey, P. Kutler, and J. O. Bridgeman. Oct 84, 27p NAS 1.15:86018, A-9877, NASA-TM-86018
Sponsored in Part by Army.

Applications of computational aerodynamics to aeronautical research, design, and analysis have increased rapidly over the past decade, and these applications offer significant benefits to aeroelasticians. The past developments are traced by means of a number of specific examples, and the trends are projected over the next several years. The crucial factors that limit the present capabilities for unsteady analyses are identified; they include computer speed and memory, algorithm and solution methods, grid generation, turbulence modeling, vortex modeling, data processing, and coupling of the aerodynamic and structural dynamic analyses. The prospects for overcoming these limitations are presented, and many improvements appear to be readily attainable. If so, a complete and reliable numerical simulation of the unsteady, transonic viscous flow around a realistic fighter aircraft configuration could become possible within the next decade. The possibilities of using artificial intelligence concepts to hasten the achievement of this goal are also discussed.

512,653
N85-12038/4/GAR PC A10/MF A01
United Technologies Research Center, East Hartford, CT.
Extended Aeroelastic Analysis for Helicopter Rotors with Prescribed Hub Motion and Blade Appended Pendulum Vibration Absorbers.
R. L. Bielawa. Dec 84, 217p NAS 1.26:172455, NASA-CR-172455
Contract NAS1-16803

The mathematical development for the expanded capabilities of the G400 rotor aeroelastic analysis was examined. The G400PA expanded analysis simulates the dynamics of all conventional rotors, blade pendulum vibration absorbers, and the higher harmonic excitations resulting from prescribed vibratory hub motions and higher harmonic blade pitch control. The methodology for modeling the unsteady stalled airloads of two dimensional airfoils is discussed. Formulations for calculating the rotor impedance matrix appropriate to the higher harmonic blade excitations are outlined. This impedance matrix, and the associated vibratory hub loads, are the rotor dynamic characteristic elements for use in the simplified coupled rotor/fuselage vibration analysis (SIMVIB). Updates to the development of the original G400 theory, program documentation, user instructions and information are presented.

512,654
N85-12039/2/GAR PC A03/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Incompressible Lifting-Surface Aerodynamics for a Rotor-Stator Combination.
S. M. Ramachandra. Oct 84, 32p NAS 1.15:83767, E-2258, NASA-TM-83767

Current literature on the three dimensional flow through compressor cascades deals with a row of rotor blades in isolation. Since the distance between the rotor and stator is usually 10 to 20 percent of the blade chord, the aerodynamic interference between them has to be considered for a proper evaluation of the aerothermodynamic performance of the stage. A unified approach to the aerodynamics of the incompressible flow through a stage is presented that uses the lifting surface theory for a compressor cascade of arbitrary camber and thickness distribution. The effects of rotor stator interference are represented as a linear function of the rotor and stator flows separately. The loading distribution on the rotor and stator flows separately. The loading distribution on the rotor and stator blades and the interference factor are determined concurrently through a matrix iteration process.

512,655
N85-12040/0/GAR PC A03/MF A01
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Flow Visualization Study of a Vortex-Wing Interaction.
R. D. Mehta, and T. T. Lim. Nov 84, 43p NAS 1.15:86656, REPT-85013, NASA-TM-86656
Original Contains Color Illustrations.

A flow visualization study in water was completed on the interaction of a streamwise vortex with a laminar boundary layer on a two-dimensional wing. The vortex was generated at the tip of a finite wing at incidence, mounted perpendicular to the main wing, and having the same chord as the main wing. The Reynolds number based on wing chord was about 5000. Two different visualization techniques were used. One involved the injection of two different colored dyes into the vortex and the boundary layer. The other technique utilized hydrogen bubbles as an indicator. The position of the vortex was varied in a directional normal to the wing. The angle of attack of the main wing was varied from -5 to +12.5 deg. The vortex induced noticeable cross flows in the wing boundary layer from a distance equivalent to 0.75 chords. When very close to the wing, the vortex entrained boundary layer fluid and caused a cross flow separation which resulted in a secondary vortex.

512,656
N85-12045/9/GAR PC A03/MF A01
Rolls-Royce Ltd., Derby (England).
Finite Element Method for the Solution of Two-Dimensional Transonic Flows in Cascades.
D. S. Whitehead, and S. G. Newton. 1 Aug 84, 38p PNR-90216

Steady two-dimensional transonic flow was calculated in cascades of compressor and turbine blades using a mesh of triangular finite elements. A velocity potential is used, the equations being solved by the Newton-Raphson technique. The resulting computer program is fast, and is shown to give good accuracy. Shock waves are well represented, if they are not too strong. The method copies with supercritical designs. For supersonic inlet flows with shocks, the results are comparable with time-marching. The program can calculate the flow in a cascade of flat plates operating like tip sections of transonic fan blades in which the flow is spilling round the leading edge and the unique incidence condition does not apply.

512,657
N85-12051/7/GAR PC A02/MF A01
National Aerospace Lab., Tokyo (Japan).
Experimental Study on the Induced Normal Force on Tail-Fins Due to Wing-Tail Interference.
M. Shirouzu, K. Saga, Y. Shibato, and T. Akimoto. May 84, 20p NAL-TR-814
In Japanese; English Summary.

The normal force on the tail fins induced by aerodynamic load on front fins was studied. The magnitude of the induced normal force was obtained experimentally from a wind tunnel test of two stage rocket models with both front and tail fin, with either front or tail fin, and without any fin. The variation of the induced normal force with bank angle difference between front and tail fin was also obtained from wind tunnel tests of a roll controllable rocket model. The results are compared with predictions based on the strip theory. This simplified theory gives approximate magnitude and Mach number dependence of the induced normal force, however, it is not sufficient for precise prediction.

512,658
N85-12316/4/GAR PC A02/MF A01
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Numerical Studies of Unsteady Transonic Flow over an Oscillating Airfoil.
W. J. Chyu, and S. S. Davis. Oct 84, 25p NAS 1.15:86011, A-9857, NASA-TM-86011

A finite-difference solution to the Navier-Stokes equations combined with a time-varying grid-generation technique was used to compute unsteady transonic flow over an oscillating airfoil. These computations were compared with experimental data (obtained at Ames Research Center) which form part of the AGARD standard configuration for aeroelastic analysis. A variety of approximations to the full Navier-Stokes equations was used to determine the effect of frequency, shock-wave motion, flow separation, and airfoil geometry on unsteady pressures and overall air loads. Good agreement is shown between experiment and theory with the limiting factor being the lack of a reliable turbulence model for high-Reynolds-number, unsteady transonic flows.

512,659
PB85-137917/GAR PC E04/MF E04
Office National d'Etudes et de Recherches Aerospatiales, Chatillon-sous-Bagneux (France).
Recherche Experimentale d'un Critere d'Eclatement pour un Tourbillon en Ecoulement Incompressible (Experimental Research of a Bursting Criterion for a Vortex in Incompressible Flow),
J. L. Solignac. Jul 84, 51p TR-27/1147/AY
Text in French.

The circumstances of vortex bursting on a delta wing were investigated as a function of parameters representing, on the one hand, the vortex intensity (wing incidence, wing sweep), on the other hand, adverse recompression (amplitude and position with respect to the wing in the downstream recompression range). In the course of these experiments, the structure of vortex flow directly upstream of the point, at which the destabilization process leading to bursting starts, was carefully defined. The results obtained were worked on in the light of certain wellknown theoretical conclu-

sions. A boundary curve for bursting, a function of two parameters, one characterizing the intensity of the vortex, the other the amplitude of the pressure jump to which it is subjected, could be experimentally determined. Without, properly speaking, constituting a criterion, this curve does define the burst in circumstances which have been called 'boundary conditions of bursting', whose exact nature remains yet to be determined.

1B. Aeronautics

512,660
AD-A148 636/4/GAR PC **A22/MF A01**
Air Force Human Resources Lab., Williams AFB, AZ.
IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984.
Final rept.,
E. G. Monroe. Sep 84, 502p Rept no. AFHRL-TR-84-36
For sales information of individual items see AD-P004 309 - AD-P004 338.

The IMAGE Conference is the only major conference devoted entirely to issues relevant to the development and use of imagery generated and displayed for visual flight simulation. The purpose of the ocnference is to provide a forum for presenting and discussing topics concerned with the imagery generated for out of the cockpit and sensor visual flight simulation. The Air Force recognizes that the rapid technological advanced and used of real-time visual simulators requires that the interchange of information among the user organizations be expanded in order to promote new deviopments, applications, and techniques, and to avoid unnecessary duplication of efforts. Papers are solicited in all areas compatible with theme of the conference including engineering research and development, behavioral research, application and techniques, program progress and status, as well as technical problems and potential solutions. Pertinent topics include but are not necessarily limited to: (1) Software/ hardware developments directly resulting in an enhancement of image capabilities. (2) Psychological determination of visual cue requirements. (3) Environmental data base design and structure.

512,661
AD-A148 816/2/GAR PC **A09/MF A01**
Federal Aviation Administration, Washington, DC. Office of Aviation Safety.
DOT/FAA Human Factors Workshop on Aviation (3th). Transcript Held at Cambridge, Massachusetts on 18-19 March 1981.
19 Mar 81, 197p Rept no. FAA-ASF-81-5
See also AD-A107 803.

This document is a verbatim transcript of the proceedings of the Third DOT/FAA Human Factors Workshop on Aviation held at the Transportation Systems Center in Cambridge, Massachusetts, on March 18-19, 1981. Additional workshops/symposiums are scheduled to address Human Factors safety issues in the coming months. The Fourth Human Factors Workshop on Aviation will be held on May 13-15, 1981. Another workshop is tentatively planned for July, 1981, at the Civil Aeronautical Institute in Oklahoma City, Oklahoma.

512,662
AD-A148 817/0/GAR PC **A15/MF A01**
Federal Aviation Administration, Washington, DC. Office of Aviation Safety.
DOT/FAA Human Factors Workshop on Aviation (5th). Transcript Held at Oklahoma City, Oklahoma on 7-8 July 1981.
May 82, 328p FAA-ASF-81-7, DOT-TSC-FAA-81-25
See also AD-A148 816.

This document is a verbatim transcript of the proceedings of the Fifth Human Factors Workshop held at the Mike Monroney Aeronautical Center in Oklahoma City, Oklahoma, on July 7-9, 1981. The Sixth Human Factors Workshop was held at the same facility on July 7 and 8, 1981. (Author)

512,663
PB84-910412/GAR PC **A03/MF A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Aircraft Accident Report - Pilgrim Airlines, Inc., Fokker F27-100, N148PM, John F. Kennedy International Airport, Jamaica, New York, January 13, 1984.
16 Oct 84, 36p NTSB/AAR-84/12
Paper copy also available on subscription, North American Continent price $55.00/year; all others write for quote.

The National Transportation Safety Board determines that the probable cause of this accident was the flightcrew's failure to use engine anti-ice on the inbound flight to JFK, the captain's failure to conduct a thorough preflight inspection, and the flightcrew's decision to use engine anti-ice on takeoff from JFK which led to power losses on both engines.

512,664
PB85-145647/GAR PC **A04/MF A01**
National Bureau of Standards (NEL), Gaithersburg, MD. Center for Fire Research.
Thermal Response of Aircraft Cabin Ceiling Materials during a Post-Crash, External Fuel-Spill, Fire Scenario,
L. Y. Cooper. Oct 84, 53p NBSIR-84/2912
Sponsored by Federal Aviation Administration, Washington, DC.

An algorithm is developed to predict the thermal response of aircraft ceiling materials during a post-crash fire scenario. The scenario involves an aircraft's emergency exit doorway which opens directly onto the flames of an external, fuel-spill fire which engulf a large portion of the fuselage. Data of near-ceiling temperatures acquired during a series of eight, full-scale, wide-body aircraft cabin, post-crash test simulations provide indirect validation of the algorithm. These tests involved cabins outfitted with single, mockup seats. Two other full-scale cabin tests involving fire spread through twenty-one seat arrays with different types of seat construction provide the input data required to exercise the algorithm in evaluations of fully outfitted cabins.

1C. Aircraft

512,665
AD-A148 676/0/GAR PC **A08/MF A01**
Army Aviation Engineering Flight Activity, Edwards AFB, CA.
Preliminary Airworthiness Evaluation of UH-60A with an Improved Airspeed System.
Final rept. 5 Oct 82-21 Apr 83,
M. L. Hanks, R. MacMullin, and G. L. Skinner. Apr 83, 158p Rept no. USAAEFA-82-09

The United States Army Aviation Engineering Flight Activity supported a contractor engineering effort to correct the nose-down pitch-over during takeoff and the large, variable position error in the low-speed flight regime of the UH-60A (Black Hawk) helicopter. A Preliminary Airworthiness Evaluation was then conducted with the improved airspeed and stabilator systems in their final configuration as defined by the contractor. Handling qualities and airspeed system characteristics were evaluated for two modified overhead and one nose probe configuration. In addition, airspeed system tests were conducted on a second nose probe configuration. Four shortcomings applicable to the modified overhead probe systems were identified as follows: (1) the annoying longitudinal control, stabilator angle, and indicated airspeed reversals resulting in pitch attitude oscillations during takeoff (upgraded from a deficiency in the standard production aircraft); (2) the high pilot workload required to maintain precise airspeed during transitions to high power, low airspeed climbs; (3) the large, variable airspeed position errors; and (4) unreliable airspeed indications in low airspeed, high power climbs. For the modified overhead probe systems the following should be accomplished: (1) evaluate the proposed installation on the External Stores Support System UH-60 helicopter, and (2) evaluate the proposed installation on an extremely light gross weight UH-60 helicopter.

512,666
AD-A148 800/6/GAR PC **A03/MF A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Composite Structure Repair. Addendum.
Aug 84, 27p Rept no. AGARD-R-716-ADD
Presented at Meeting of the Structures and Materials Panel, Sienna, Italy, 2-6 Apr 84. Addendum to AD-A141 456.

Contents: Repair of Composites; and Composite Repair of Aircraft Structures.

512,667
N85-12043/4/GAR PC **A03/MF A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Brunswick (Germany, F.R.).
Design of a Basic Airfoil for a Slightly Swept Wing. Part 1: Theoretical Transonic Airfoil Design.
G. Wichmann. Mar 84, 47p DFVLR-FB-84-19-PT-1
In German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-892).

The design procedure of a basic airfoil for a slightly swept transport aircraft wing is described. It is shown that transonic wing technology reduces sweep by retaining wing thickness and cruise Mach number.

512,668
N85-12050/9/GAR PC **A06/MF A01**
Aeronautical Research Labs., Melbourne (Australia).
In-Flight Estimation and Indication of Cumulative Fatigue Damage to Helicopter Gears.
K. F. Fraser. Mar 84, 113p ARL-AERO-PROP-REPORT-164, AR-003-013

The safe fatigue life of helicopter transmission components made if in service load data together with transmission fatigue data, represented as the number of cycles of failure as a function of tooth load, were estimated. Instrumentation was developed to provide in flight estimation and indication of the proportion of safe fatigue life expended for critical gears in single or twin engine helicopter transmission systems. Basic transmission load data in the form of totalized times spent in a number of contiguous torque bands are continually updated and stored during flight. The basic load data together with values of life expenditure for critical gears for the current flight are printed out after flight. This technique opens the way towards fatigue life monitoring of individual transmissions. The special demands of the life estimating system and in particular the very significant effects of errors in mean torque estimation are assessed.

512,669
PB85-137222/GAR PC **E04/MF E04**
Centre d'Essais en Vol, Istres (France).
Planeur Propulse DG 400 (Propelled Glider DG 400).
12 Sep 84, 66p CEV/IS/SE/AV-84/7
Text in French.

The propelled glider DG 400 is directly derived from its predecessor DG 200, certificated in France in February of 1980, and more in particular from the last version DG 202, presented at the CEV in January 1981. Its aerodynamic definition is the same, once the engine is retracted, and it preserves the possibility of being used in 15 or 17 m spread by the addition of detachable airfoil extremities (2 x 1 m). The tail wheel is conjugated with the direction and at 17 m the detachable wing tips are fitted with small wheels which ease takeoff without outside assistance. The motopropeller group is made up of the engine ROTAX 505, two-time bicylinder with air cooling, equipped with two carburators, double electrical lighting system, and a two-blade propeller with fixed pitch Hoffmann HO 11 F - 128 B 84. The whole is retracted electrically in the dorsal fuselage section in back of the airfoils. A propeller braking system assures its stoppage at the moment the motor is retracted in the fuselage. Some photographs shown in Figs. 1 to 6 complete this identification.

1D. Aircraft Flight Control and Instrumentation

512,670
N85-12521/9/GAR PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.

Wind Shear Measuring on Board an Airliner.
P. Krauspe. May 84, 24p NAS 1.15:77463, DFVLR-MITT-80-09, NASA-TM-77463
Contract NASW-3541
Transl. into English of "Scherwindmssungen im Linienflugbetrieb" Rept. Dlvlr-Mitt-80-09 Dlvlr, Presented at the 10TH Symp. on Aircraft Integrated Data Systems, 1980 p 95-119. Original Language Document Was Announced as N81-20011. Transl. by Kanner (Leo) Associates, Redwood City, CA. Symp. Held in Aachen, 26-27 Mar. 1980.

A measurement technique which continuously determines the wind vector on board an airliner during take-off and landing is introduced. Its implementation is intended to deliver sufficient statistical background concerning low frequency wind changes in the atmospheric boundary layer and extended knowledge about deterministic wind shear modeling. The wind measurement scheme is described and the adaptation of apparatus onboard an A300 airbus is shown. Preliminary measurements made during level flight demonstrate the validity of the method.

1E. Air Facilities

512,671

AD-A148 840/2/GAR PC **A07/MF A01**
Construction Engineering Research Lab. (Army), Champaign, IL.
Prototype Concept Design for U.S. Army Type IIIA Air Traffic Control Tower (ATCT).
Final rept.,
T. R. Napier, and M. E. Lierman. Oct 84, 143p Rept no. CERL-TR-P-85/02

In April 1983, the U.S. Army Air Traffic Control Activity requested the U.S. Army Construction Engineering Research Laboratory to develop a prototype concept design for a Type IIIa Air Traffic Control Tower (ATCT). The design was to be for a prefabricated, modular, and transportable building system that could be fabricated, placed in storage, deployed, and erected in a variety of configurations. This report documents the development of functional requirements for the Type IIIa ATCT, as well as considerations for its prefabrication, transportation, and erection. The report also presents the prototype concept design for the Type IIIa ATCT. The design includes architectural drawings as well as descriptions of the building system's construction approach and materials. Information needed to acquire these facilities is presented, including recommendations for a One-Step or Two-Step procurement approach and guidance to Corps personnel for executing this approach. Finally, the report provides an outline for bid documentation, including an outline specification for the building system.

512,672

PB85-139533/GAR PC **E04/MF E04**
Civil Aviation Authority, London (England).
Runway Capacity of Major Airports (with Special Reference to Heathrow),
G. A. Paulson. c1984, 53p CAA/PAPER-84016, ISBN-0-86039-226-0

This Paper reviews the factors which affect hourly runway capacity and concludes that Heathrow's 'segregated' mode of operation provides for optimum flow rates. The derivation of annual capacity from hourly rates suggests that currently at Heathrow there exist some 305-310,000 ATM slots per year declining in the 1990's to 280-285,000. Although Heathrow handles fewer movements than the major American international airports its capacity is similar to those operated under the same constraints. Heathrow offers more capacity than the major European airports. (Copyright (c) Civil Aviation Authority 1984.)

2. AGRICULTURE

2B. Agricultural Economics

512,673

PB85-129607/GAR PC **A03/MF A01**
Committee for the Promotion of Aid to Cooperatives, Rome (Italy).
Cooperative Development in the Democratic Republic of the Sudan.
Dec 80, 49p COOPERATIVE INFORMATION NOTE-1, AID-PN-AAK-496

Although Sudan's 4,000 cooperatives dominate no sector of the economy, they nevertheless play an important role in distributing essential consumer commodities and in mobilizing the poor. This report summarizes the status of cooperative development and the operation of cooperatives in Sudan's Northern and Southern Regions.

512,674

PB85-131829/GAR PC **A03/MF A01**
International Bank for Reconstruction and Development, Washington, DC. Economic Development Inst.
Role of Finance in Rural Development,
E. J. Ray. Sep 81, 37p BACKGROUND PAPER-5, AID-PN-AAJ-976
Contract AID/TA-BMA-7
Prepared in cooperation with Ohio State Univ., Columbus. Presented at Colloquium on Rural Finance, September 1-3, 1981, Washington, DC.

This paper analyzes the role of finance in growth and development. In section II the complementarity between the proper functioning of real and financial markets is discussed. In section III, optimal intervention analysis is used to explain government intervention at every level of economic activity and the multiply distorted environment within which financial reforms are considered. In section IV subsidized credit programs as instruments to promote efficiency, redistribute income, and/or foster viable financial institutions are rejected. In conclusion, it is argued that external funds could be used productively to mobilize rural savings, promote development of financial markets, and reduce internal resistance to general market reforms.

512,675

PB85-131902/GAR PC **A02/MF A01**
International Bank for Reconstruction and Development, Washington, DC. Economic Development Inst.
Are the Arguments for Cheap Agricultural Credit Sound.
Discussion paper,
D. W. Adams. Sep 81, 24p DP-1, AID-PN-AAJ-965
Contract AID/TA-BMA-7
Prepared in cooperation with Ohio State Univ., Columbus. Presented at Colloquium on Rural Finance, September 1-3, 1981, Washington, DC.

The provision of cheap agricultural credit (CAC), a common practice in developing countries, leads to inefficient resource allocation, concentration of income, and poor rural financial market performance. Eight common arguments used to justify low interest rates on agricultural credit are evaluated. It is pointed out that these arguments are either based on value judgments, are unsound, and/or wrong. Conclusions are that more flexible nominal interest rate policies that resulted in positive real rates of interest would improve efficiency of resource allocation, lead to less income concentration and improve the overall performance of rural financial markets.

512,676

PB85-131910/GAR PC **A03/MF A01**
International Bank for Reconstruction and Development, Washington, DC. Economic Development Inst.
Interest Rate Policies, Agricultural Credit and Income Distribution in Latin America.
Discussion paper,
C. Gonzalez-Vega. Sep 81, 35p DP-3, AID-PN-AAJ-966
Contract AID/TA-BMA-7
Prepared in cooperation with Ohio State Univ., Columbus. Presented at Colloquium on Rural Finance, September 1-3, 1981, Washington, DC.

Low interest rate ceilings in Latin America, generally considered a panacea for the poor farmer, have actually harmed the small farmer and - with 80% of loan funds going to 3% of farm producers - exacerbated an already unequal distribution of wealth. So concludes this report on the impact of interest rates on income distribution in Latin America. The author argues that underpricing credit affects income distribution in two ways. First, ceilings create for borrowers a subsidy directly proportional to the loan size. The effect of subsidization is regressive. Large borrowers get large loans and receive a substantial subsidy; small borrowers receive small loans and a smaller subsidy; non-borrowers, usually the smallest producers, receive no subsidy. Second, low interest ceilings create excess demand for credit, forcing lenders to develop a non-price means of rationing loans. The author therefore reviews several theories of non-price credit rationing which are based on the theory of the firm and on portfolio theory, and develops a simple model to demonstrate the mechanism by which rationing processes favor larger, safer, long-standing borrowers at the expense of smaller, riskier, newer borrowers. The author highlights one such device popular in Latin America, credit limits avios based on the size of area cultivated and on the crop grown.

512,677

PB85-133056/GAR PC **A03/MF A01**
Charles R. Drew Postgraduate Medical School, Los Angeles, CA.
Planning for Integrated Rural and Community Development: Concept Paper,
P. S. Yoder. 1979, 42p AID-PN-AAL-323
Prepared in cooperation with Martin Luther King, Jr. Hospital, Los Angeles, CA.

To counter the failure of many past development efforts, this report presents a rationale for planning integrated rural development (IRD) projects which recognize the complex relationships which obtain among the many domains of daily life. The report is organized into sections reflecting various lessons learned from the successes and failures of past development projects. The first section defines development and discusses the various criteria used to measure it. The second section presents generalizations about rural life in the Third World. The third section compares alternative development strategies. The fourth section details several issues which must be addressed in designing and implementing any project, while the fifth section describes the specific components of IRD projects. Finally, the authors present the case for IRD. IRD projects are integrated in two senses - they involve several sectors and they recognize that changes brought about in one domain engender changes in other domains of everyday life. The authors argue that projects which are relatively small and geared to a longer timeframe have a greater chance for success. Also, project personnel must take seriously local expressions of what is needed and what is workable.

512,678

PB85-134252/GAR PC **A13/MF A01**
Winrock International, Morrilton, AR.
Assessment of the Belize Livestock Sector.
Final rept.
31 Oct 82, 267p AID-PN-AAL-401
Contract AID-LAC-0000-C-00-2041-00

Belize's livestock sector has great potential for contributing to the country's overall economic well-being. Serious constraints to the realization of this potential may be alleviated in part, according to this livestock sector analysis, by an integrated program of financial and technical assistance supported by A.I.D. in coordination with other individual and institutional efforts in Belize. The body of the report covers the various livestock industries - cattle, swine, dairy, sheep, goat, and poultry. Feed resources such as pasture and grains are examined, as are livestock demand and the marketing structure. Lastly, Belize's education, training, and agricultural credit and agricultural policies are reviewed.

512,679
PB85-135325/GAR PC **A18/MF A01**
Centro Internacional de Agricultura Tropical, Cali (Colombia).
Amazonia: Agriculture and Land Use Research,
S. B. Hecht, G. A. Nores, P. A. Sanchez, J. M. Spain, and G. Toenniessen. May 82, 419p ISBN-84-89206-13-9, AID-PN-AAM-092
Sponsored by Rockefeller Foundation, New York, and North Carolina State Univ. at Raleigh.

This paper reports the proceedings of a conference to identify and promote research programs which could lead to improved agricultural technologies suited to Amazonia. The report first presents overviews of the national policies of Bolivia, Brazil, Colombia, Ecuador, Peru, and Venezuela concerning agricultural development in Amazonia. Next, five technical reports review the current state of knowledge on the Amazonian ecosystem and analyze alternative land use options. Natural resources, soil management, pasture and animal production, and perennial crops are discussed.

512,680
PB85-136026/GAR PC **A12/MF A01**
Development Alternatives, Inc., Washington, DC.
Local Organizations and Rural Development: A Comparative Reappraisal. Volume 1,
D. D. Gow, E. R. Morss, D. R. Jackson, D. S. Humpal, and C. F. Sweet. Oct 79, 259p AID-PN-AAL-953-1
Contract AID/CM/ta-C-1323
See also PB85-136034.

While local rural organizations can be used positively to provide two-way communication, minimize risk, achieve economies of scale, promote political and economic independence, and spread the benefits of donor assistance among the rural poor, these same organizations can be used negatively to perpetuate inequities, control rural peoples, and weaken or destroy viable local cultures. This two-volume report identifies the potentials and dangers of using local organizations to increase the well-being of the rural poor and details how A.I.D. might design and implement projects to make effective use of these organizations. Volume I presents the results of a comparative study of local organizations, including quantitative and qualitative analyses of these results and policy recommendations for A.I.D. Volume II contains 24 detailed case studies of local organizations in Upper Volta, Cameroon, Yemen, Guatemala, Peru, the Philippines, and Jamaica. After summarizing current thinking on the use of local organizations, the authors discuss the prevailing strategies for local organizational intervention.

512,681
PB85-136034/GAR PC **A16/MF A01**
Development Alternatives, Inc., Washington, DC.
Local Organizations and Rural Development: A Comparative Reappraisal. Volume 2. Case Studies,
D. D. Gow, E. R. Morss, D. R. Jackson, D. S. Humpal, and C. F. Sweet. Oct 79, 354p AID-PN-AAL-953-2
Contract AID/CM/ta-C-1323
See also PB85-136026.

While local rural organizations can be used positively to provide two-way communication, minimize risk, achieve economies of scale, promote political and economic independence, and spread the benefits of donor assistance among the rural poor, these same organizations can be used negatively to perpetuate inequities, control rural peoples, and weaken or destroy viable local cultures. This two-volume report identifies the potentials and dangers of using local organizations to increase the well-being of the rural poor and details how A.I.D. might design and implement projects to make effective use of these organizations. Volume I presents the results of a comparative study of local organizations, including quantitative and qualitative analyses of these results and policy recommendations for A.I.D. Volume II contains 24 detailed case studies of local organizations in Upper Volta, Cameroon, Yemen, Guatemala, Peru, the Philippines, and Jamaica. After summarizing current thinking on the use of local organizations, the authors discuss the prevailing strategies for local organizational intervention.

512,682
PB85-136281/GAR PC **A05/MF A01**
Agency for International Development, Washington, DC.
Agricultural Research in Northeastern Thailand.
Project impact evaluation rept. no. 34,
M. M. Calavan, J. DeBoer, P. Rodwinij, I. Sooksathan, and J. D. Wilson. May 82, 89p AID-PN-AAJ-615
Prepared in cooperation with Winrock International, Morrilton, AR., and Kasetsart Univ., Bangkok (Thailand).

In 1966, A.I.D. initiated a project to establish a major multidisciplinary agricultural research center at the Tha Phra in Northeastern Thailand. This report summarizes the project's setting and activities, describes its impacts, and presents lessons learned.

512,683
PB85-136679/GAR PC **A03/MF A01**
Consortium for International Development, Tucson, AZ.
Rural Development and Effective Extension Strategies: Farmers' and Officials' Views in Egypt.
Technical rept.,
M. S. Sallam, E. C. Knop, and S. A. Knop. 1984, 50p AID-PN-AAL-832
Contract AID/NE-C-1351
Also pub. as Egypt Water Use and Management Project, Cairo. rept. no. EWUP/TR-19. Prepared in cooperation with Colorado State Univ., Fort Collins. Engineering Research Center.

The first step in any extension program should be to determine the needs of the constituent population and the best means for fulfilling them. Toward this end, 75 Egyptian farmers from three representative areas of the Nile Valley and agricultural officials from all levels of government were surveyed. Researchers asked opinions about the helpfulness of various people in forwarding rural development, what changes were desirable, and what implementation strategies should be selected. Responses are presented against a review of current agricultural and irrigation development and extension activities in Egypt.

512,684
PB85-136778/GAR PC **A03/MF A01**
Agricultural Cooperative Development International, Washington, DC.
Fertilizer Bulk Blending in Costa Rica,
A. Soday, H. Weir, and K. B. Carpenter. Jan 83, 29p AID-PD-AAM-401
Contract AID/IQC/PDC-0100-I-09-2067-00

A study conducted in 1982 of the economic and technical feasibility of establishing a fertilizer bulk blend plant for Costa Rica's cooperative sector in herein reported. Discussion is given in turn to the production levels, facilities, and marketing philosophy of the Government-owned chemical-process fertilizer plant, Fertica; the world and local fertilizer marketing situations; cost requirements for bulk blending of fertilizer in Costa Rica; and the advantages and disadvantages of Fertica's marketing infrastructure.

512,685
PB85-137552/GAR PC **A02/MF A01**
Foreign Agricultural Service, Washington, DC.
World Cotton Situation, November 1984.
Foreign agriculture circular.
Nov 84, 22p FC-12-84
See also PB85-119774.

Larger cotton crop estimates in the U.S., China and Pakistan are boosting 1984/85 world production to a record 80.7 million bales, 20% above 1983/84. Chinese production has been increased to 25.3 million bales, almost as much as the next two largest producers--the United States and the Soviet Union--combined. Pakistani production was increased this month to 3.7 million bales, a complete recovery from the weather and insect-reduced crop of last season. World consumption was reduced slightly from last month's estimate reflecting the downward revision in U.S. mill use, primarily the result of large cotton textile imports. World cotton trade is forecast at slightly over 20 million bales. China is expected to account for 44% of world and 51% of foreign stocks. International cotton prices increased slightly during October, reversing the trend of recent months.

512,686
PB85-137560/GAR PC **A03/MF A01**
Foreign Agricultural Service, Washington, DC.
World Dairy Situation and Outlook, November 1984.
Foreign agriculture circular.
Nov 84, 34p FD-2-84
See also PB84-210921.

World milk production is expected to be down slightly in 1984 as output in both the European Community (EC) and the United States declines by over 2%. Milk output in 1985 is projected to remain close to 1984 levels. The decline in milk supplies reduced milk available for the manufacture of dairy products in 1984. Although cheese output increased about 1%, production of butter and nonfat dry milk declined. World trade in dairy products increased in 1984 and is projected to rise again in 1985.

512,687
PB85-137826/GAR PC **A14/MF A01**
Agribusiness Associates, Inc., Wellesley Hills, MA.
Agribusiness Investment Opportunities in Jamaica.
Dec 81, 302p AID-PN-AAL-677

The current Government of Jamaica has identified foreign investors as critical to the success of its policy to promote agribusiness, especially export agriculture. This report, written by and for businessmen, analyzes opportunities for U.S. private sector investment in Jamaican agribusiness. A discussion of the environment for agribusiness in Jamaica provides information on domestic and export markets and on the agricultural sector, including its institutions and policies; USAID/J programs; financing, labor, assembly and distribution systems; and research and extension activities. A number of problems facing agribusiness investors are also identified, including shortages of capital and management personnel, agricultural theft, and the small domestic market. A second section reviews production and distribution systems for various commodities, including coffee, cocoa, sugar, bananas, legumes, fishery products, and alcoholic beverages. Lastly, background data on Jamaica's currency, geography, climate, politics, economy, and land and water resources are provided. In sum, to successfully invest in Jamaican agribusiness, the U.S. investor must have access to a market that he understands, technical and management expertise, and capital.

512,688
PB85-137941/GAR PC **A04/MF A01**
Egyptian Major Cereals Improvement Project, Cairo.
Analytical Economic Study of Maize Production in Egypt,
A. M. M. Basheer. Oct 81, 63p EMCIP/PUB-33, AID-PN-AAL-686
Prepared in cooperation with Consortium for International Development, Tucson, AZ.

Total maize consumption in Egypt has more than doubled in the past 20 years and may double again by the year 2000, far exceeding feasible production and import levels. Constraints to increased maize yield include insufficient local production of high-yielding variety seed, delays in maize planting due to harvesting of wheat and clover, lack of mechanization and of hand labor, and unfavorable farming practices. This study presents an economic analysis of maize production in the Egyptian Major Cereals Improvement Project.

512,689
PB85-138048/GAR PC **A07/MF A01**
Arizona Univ., Tucson. Office of Arid Lands Studies.
Draft Environmental Profile of the Kingdom of Lesotho,
S. L. Hilty. May 82, 126p
Contracts AID-RSSA-SA/TOA-1-77, NPS-CX-0001-0-0003
Sponsored by National Committee for Man and the Biosphere, Washington, DC.

The Kingdom of Lesotho, with few natural resources, little arable land, and very low agricultural productivity, faces a difficult future. In this draft environmental profile, a survey is presented of the country's climate, geography, population, land use, agriculture, natural resources, fauna, conservation measures, and environmental, soil, and water conservation problems. The most serious environmental problem is soil erosion; loss of soil and declining soil productivity is increasing, despite efforts to reverse the trend.

512,690
PB85-138329/GAR PC **A04/MF A01**

Foreign Agricultural Service, Washington, DC.
World Oilseed Situation and U.S. Export Opportunities, November 1984.
Foreign agriculture circular.
Nov 84, 66p FOP-11-84
See also PB85-119741.

Large oilseed supplies remain the dominant feature of the world oilseeds and products situation despite a 4% reduction from last month's forecast in the 1984 U.S. soybean production estimate. A substantial increase in world cottonseed production was only partially offset by reduced peanut production. The production forecast for all oilseeds is 184.2 mil tons, down less than 0.4% from last month's forecast and up 11% from 1983/84 production. Ample oilseed supplies contrast with slightly reduced trade and stable crush forecasts. The estimate of world soybean meal consumption was reduced by about 300,000 tons, offset by increased consumption of other protein meals. Overall, a 6% increase from last year in world consumption of major protein meals is still in prospect. U.S. 1984/85 season average price forecasts increased 10 cents per bushel for soybeans to $6.00-7.20 and 1 cent per pound for soybean oil to 26.0-32.0; but remained the same for soybean meal at $145-165 per short ton.

512,691

PB85-139186/GAR PC A05/MF A01
Foreign Agricultural Service, Washington, DC.
World Oilseed Situation and U.S. Export Opportunities, November 1984: Reference Tables on the Major Producing, Consuming, and Trading Countries of Cottonseed, Cottonseed Meal and Oil.
Foreign agriculture circular.
Nov 84, 96p CIRC SUPPL-6-84
See also PB85-119741.

This publication contains the latest available supply/distribution estimates for cottonseed, cottonseed meal and cottonseed oil data base. The sources used for obtaining statistics include Agricultural Counselor and Attache reports, official statistics released by foreign governments, and trade publications.

512,692

PB85-139871/GAR PC A02/MF A01
Foreign Agricultural Service, Washington, DC.
USSR Grain Situation and Outlook, November 1984.
Foreign agriculture circular.
13 Nov 84, 9p SG-13-84
See also PB85-120004.

The past month has seen little change in the 1984/85 USSR grain situation. Crop and import estimates are unchanged from a month ago. Buying activity has slowed. While the pace of imports has quickened, recent shipments from the United States apparently have fallen behind schedule. Record or near record livestock inventories continue to provide a strong base for domestic grain utilization.

512,693

PB85-139889/GAR PC A03/MF A01
Foreign Agricultural Service, Washington, DC.
World Grain Situation/Outlook, November 1984.
Foreign agriculture circular.
Nov 84, 34p FG-14-84
See also PB85-119618.

Rising forecast production has increased exportable supplies of wheat and coarse grains over the past month, heightening the level of competition among export countries and adding to 1984/85 ending stocks. This trend includes not only Europe and the Southern Hemisphere exporters, but also China and India where some surplus production is now expected to move into export channels. Over the next few months, the major variables in the current trade scenario are the outcome of Southern Hemisphere crops and the export potential of several non-traditional exporting countries. For rice, preliminary projections for calendar year 1985 show world trade down somewhat from 1984, although import demand and export availability may need to be reassessed as the Asian harvest progresses.

512,694

PB85-139905/GAR PC A05/MF A01
Economic Research Service, Washington, DC. National Economics Div.
Cropland Use Model: Theory and Suggestions for Estimating Planted Acreage Response.
Staff rept.,
P. Gallagher, and R. C. Green. Nov 84, 76p AGES-840410

This report develops the theory of a cropland use model, reports the results of estimating land devoted to crop production, and shows example applications of the cropland use model in estimating planted acreage response for corn, sorghum, barley, oats, soybeans, and wheat. The model first estimates the total amount of land that will be planted to principal crops and then allocates cropland planted to specific crops.

512,695

PB85-140127/GAR PC A04/MF A01
International Food Policy Research Inst., Washington, DC.
Instability in Indian Foodgrain Production.
Research rept.,
P. B. R. Hazell. May 82, 64p RR-30, AID-PN-AAL-185
Grant AID/DAN-4026-G-00-1009-00

Although total cereal production in India has increased significantly during the past three decades, production has become more unstable, threatening poor farmers with periodic food shortages. This study uses State and crop data on cereal production and areas sown in different cereals to examine how improved technologies have increased instability in total cereal production. The most promising solution to threats brought on by unstable production would be policies which attempt to stabilize consumption, such as storage and trade policies.

512,696

PB85-140242/GAR PC A03/MF A01
National Association of Schools of Public Affairs and Administration, Washington, DC.
People Centered Planning: The USAID/Philippines Experience,
G. Carner, and D. C. Korten. Mar 82, 31p NASPAA/WP-2, AID-PN-AAL-139

Arguing that conventional planning methodologies tend to stress the expansion of modern sector economic activity and welfare measures to meet the basic needs of the poor, the authors of this report describe efforts by USAID/Philippines to develop a people-centered planning methodology aimed at identifying and relieving constraints to productive self-help action. Available indigenous data on household survival strategies of the poor were examined in conjunction with macro-level analyses to provide a framework for determining the causes of poverty in the Philippines. Results of the analysis were used to formulate the current USAID/Philippines assistance strategy, which aims at increasing productive employment through programs to develop rainfed resources and rural private enterprises, manage local resources, and reduce fertility and infant mortality. A proposed USAID/Philippines project to begin applying the new strategy is briefly described. A concluding section of this report notes the importance of household-level data for development planning and various lessons regarding the conditions necessary for successful Mission-level innovation. An analysis of survival strategies of landless agricultural workers is appended.

512,697

PB85-854586/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Developing Countries: Agricultural Economics. 1971-January 1985 (Citations from the NTIS Data Base).
Rept. for 1971-Jan 85.
Jan 85, 236p
Supersedes PB84-854355.

This bibliography contains citations concerning the economic aspects of agriculture in the third world. Factors affecting agricultural development such as cropping systems, post production systems, commodity systems, management systems, etc. are discussed and analyzed. Attention is also given to the economic impacts of technological, political, and demographic factors upon third world agriculture. Some historical information and global food assessments are presented as they relate to developing nations. (This updated bibliography contains 304 citations, 150 of which are new entries to the previous edition.)

2C. Agricultural Engineering

512,698

PB85-129187/GAR PC A11/MF A01
Tennessee Valley Authority, Knoxville.
Methods of Fertilizer Application (Sposoby Vnesenlya Udobrenii),
V. E. Bulaev. c1984, 239p TT-77-52040
Trans. from Vsesoyuznaya Akademiya Sel'skokhozyaistvennykh Nauk. Doklady (USSR) 1976 by R. K. Dhote. Sponsored in part by National Science Foundation, Washington, DC.

This book is devoted to the agrochemical principles of local application of fertilizers. The contributors to this volume have examined different aspects of the technology, management and mechanization of fertilizer application. The theoretical and experimental bases for introducing new methods and machinery for this purpose have been outlined. The book is meant for agronomists, agriculture chemists, designers and specialists in farm machinery.

512,699

PB85-129989/GAR PC E04/MF E01
Jordbrukstekniska Inst., Uppsala (Sweden).
Ny Skoerdetroeskteknik (New Technique of Combine-Harvesting),
G. Lundin. c1984, 72p BULL-404
Text in Swedish.

The technical development within combine-harvesting during recent years is characterized by several innovations. Alternative combining principles are coming into use. Equipment for control and supervision of the functions of the combine has been developed. This development is illustrated in the present Bulletin. This report gives an account of experiences with axial combines in Swedish and foreign experiments. The combines tested were almost exclusively International Harvester.

512,700

PB85-133585/GAR PC A05/MF A01
Consortium for International Development, Tucson, AZ.
Feasibility Studies and Evaluation of Irrigation Projects: Procedures for Analyzing Alternative Water Distribution Systems in Egypt.
Technical rept.,
R. J. McConnen, F. A. Aal, M. Skold, G. Ayad, and E. Sorial. Jul 82, 91p AID-PN-AAL-614
Contract AID/NE-C-1351
Also pub. as Egypt Water Use and Management Project, Cairo. rept. no. EWUP/TR-12. Prepared in cooperation with Colorado State Univ., Fort Collins. Engineering Research Center.

There exists today a host of opportunities for rebuilding Egypt's existing irrigation system and developing new systems. This report outlines a methodology for comparing various irrigation water distribution systems prior to implementing an irrigation program. Following a brief discussion of benefit/cost analyses, the authors recommend use of partial-budget analyses.

512,701

PB85-136000/GAR PC A03/MF A01
Consortium for International Development, Tucson, AZ.
Social Dimensions of Egyptian Irrigation Patterns.
Technical rept.,
E. C. Knop, M. S. Sallam, S. Knop, and M. E. Kady. Sep 82, 37p AID-PN-AAM-200
Contract AID/NE-C-1351
Also pub. as Egypt Water Use and Management Project, Cairo. rept. no. EWUP/TR-26. Prepared in cooperation with Colorado State Univ., Fort Collins. Engineering Research Center.

Irrigation practices depend not only on physical conditions, but also on the socioeconomic patterns which influence farmers' lives. The Egypt Water Use and Management project team examined 28 sociological factors which could potentially influence farmers' irrigation behavior. Eleven of these factors showed significant statistical correlation with one or more of the 5 irrigation practices selected for study. The sociological factors were divided into background factors which could account for irrigation behavior in a general way, and situational factors which are related to types of behavior in particular sets of circumstances. Situational factors were found to have more significant correla-

tions with irrigation behavior than background factors. Situational factors could also provide researchers with explanations for irrigation behavior. The study showed that a definite correlation exists between sociological factors and irrigation practices.

512,702

PB85-136016/GAR PC **A03**/MF **A01**
Consortium for International Development, Tucson, AZ.
Irrigation Pumping. Planning Guide No. 3, Water Management Synthesis Project,
R. E. Griffin, and G. H. Hargreaves. Jun 82, 28p AID-PN-AAL-390
Contract AID/DSAN-C-0058
Prepared in cooperation with Colorado State Univ., Fort Collins. Engineering Research Center, and Utah State Univ., Logan. Dept. of Agricultural and Irrigation Engineering.

In many areas of the developing world, pumping water may be the only solution to irrigating lands needed to increase agricultural production. This illustrated report is designed to serve as a guide in planning water pumping projects. First, power sources (gasoline, diesel, electricity, and propane or natural gas) are reviewed and alternatives for powering mechanical pumps are compared. Three types of mechanical pumps - centrifugal, propeller, and turbine - and their particular applications are then considered.

512,703

PB85-136687/GAR PC **A02**/MF **A01**
International Rice Research Inst., Los Banos, Laguna (Philippines).
Farm Machinery for Upland Rice,
R. C. Fischer. Oct 81, 21p AID-PN-AAL-816

Farm mechanization can directly relieve labor shortages during tilling, transplanting, harvesting, and threshing; indirect benefits accruing to mechanization may also be substantial. This paper makes a case for the increased mechanization of rice farming on approximately 400,000 ha of upland farms in Thailand.

512,704

PB85-137750/GAR PC **A04**/MF **A01**
Soil Conservation Service, Washington, DC.
Water Quality Field Guide.
Sep 83, 62p SCS-TP-160

Purpose of this guide is to provide information on water quality improvement to Soil Conservation Service (SCS) Field Office personnel for the control of nonpoint sources of pollution from agricultural lands, and to incorporate water quality perspectives into SCS conservation planning. The guide covers all agricultural lands, and addresses the most common land uses - cropland, hayland, pastureland, rangeland, and woodland. It does not cover acid mine drainage or dryland saline seeps. It focuses on five major classes of pollutants from agricultural sources (i.e. nutrients, sediment, animal waste, salts and pesticides).

512,705

PB85-137818/GAR PC **A03**/MF **A01**
Consortium for International Development, Tucson, AZ.
Rotation Water Distribution System vs. Continual Flow Water Distribution System,
M. El-Kady, J. Wolfe, and H. Wahby. Apr 82, 33p AID-PN-AAL-683
Contract AID/NE-C-1351
Also pub. as Egypt Water Use and Management Project, Cairo. rept. no. EWUP/TR-20. Prepared in cooperation with Colorado State Univ., Fort Collins.

Two types of irrigation systems introduced in Egypt under A.I.D.'s Water Use and Management Project, the traditional rotational system and the continuous flow system, were compared for effectiveness in water distibution as herein reported. The two systems were compared on nine counts: (1) water savings; (2) acceptability to farmers; (3) equitable distribution of water; (4) length of interval between irrigations; (5) effect on water table; (6) land savings; (7) effect on seepage from canals; (8) effect on growth of weeds in canals; and (9) crop yield.

2D. Agronomy and Horticulture

512,706

PB85-133437/GAR PC **A16**/MF **A01**
Department of Agriculture, Washington, DC.
Heat and Mass Transfer in the Plant-Soil-Air System,
S. V. Nerpin, and A. F. Chudnovskii. c1984, 368p TT-77-52008
Trans. from mono. E'nergo-i Masso-Obmen v Sisteme Rastenie-Pochva-Vozdukh, Leningrad, 1975 by M. M. Sivaramakrishnan. Sponsored in part by National Science Foundation, Washington, DC.

This book deals with the problems of energy and mass transfer in the plant environment. In recent years these problems have attracted the attention of a wide circle of specialists. This interest can be attributed to the formulation of problems on the optimization of processes in agriculture based on forecasting agrometeorological and soilhydrological conditions. The monograph examines the mechanisms of the processes of energy and mass transfer, and the mathematical formulation and solution of a number of boundary value problems of energy and mass transfer in the soil, the subsoil, and the atmosphere near the ground. The book is intended for agronomists, agrometeorologists, biologists, soil scientists, physicists and mathematicians.

512,707

PB85-135374/GAR PC **A21**/MF **A01**
Asian Vegetable Research and Development Center, Tainan (Taiwan).
Chinese Cabbage: Proceedings of the First International Symposium,
N. S. Talekar, and T. D. Griggs. 1981, 491p AVRDC/PUB-81/138, AID-PN-AAM-030

Chinese cabbage is favored by Asian small farmers because of its rapid growth, its ability to readily generate cash income, and its value as a source of calcium, crude fiber, and vitamin C. Forty-five papers are presented on the following topics: general information (origin, evolution, taxonomy, and hybridization and development in Japan, Korea, Taiwan, and Bangladesh); plant protection; plant physiology; physiology of reproduction; and plant breeding.

512,708

PB85-136364/GAR PC **A13**/MF **A01**
Asian Vegetable Research and Development Center, Tainan (Taiwan).
International Symposium on Tropical Tomato (1st) Held at Shanhua, Taiwan, Republic of China on 23-27 October 1978,
R. Cowell. Feb 79, 295p AVRDC/PUB-78/59, AID-PN-AAL-892
Grant AID/DSAN-G-0057

This report contains 27 papers presented at the first International Symposium on Tropical Tomato, held at the AVRDC in Taiwan. The papers are presented in six sections covering: the tomato in the tropics (problems and progress, small-scale production, processing, consumption and use in Taiwan, commercial trials in New Guinea); physiology and plant nutrition (tropical fertilizer requirements, effect of temperature on growth and tomato fruit-set); diseases and pests.

512,709

PB85-136752/GAR PC **A05**/MF **A01**
Agency for International Development, Washington, DC.
Food Grain Technology: Agricultural Research in Nepal.
Project impact evaluation rept. no. 33,
E. B. Simmons, J. W. Beausoleil, G. Ender, G. Heist, and J. Murphy. May 82, 95p AID-PN-AAJ-614
Prepared in cooperation with Department of Agriculture, Washington, DC., and Cornell Univ., Ithaca, NY.

Examination of the impact of a 17-year food grain technology project in Nepal (1957-74), presented in this report, provides both a sense of solid accomplishment and a basis for some disquieting fears. Project accomplishments include development of a functional and decentralized research system with five stations in the Tarai flatlands, training to B.S., M.S., and Ph.D. levels of almost 600 Nepali agricultural scientists, a sharp increase in farmers' awareness of the need for agricultural development, and the beginnings of a partnership between research and extension. Technology packages including improved wheat, rice, and maize varieties were extended to Tarai farmers and farmer awareness of the new technology was found to be virtually universal.

512,710

PB85-140101/GAR PC **A03**/MF **A01**
Utah State Univ., Logan. Dept. of Agricultural and Irrigation Engineering.
Dependable Precipitation and Potential Yields for Senegal: A Practical Guide for Rainfed Agriculture,
G. H. Hargreaves. May 82, 40p AID-PN-AAL-110
Sponsored by Department of Agriculture, Washington, DC.

A substantial potential exists for improving rainfed agriculture in Senegal. Thus concludes this study, which analyzes the relationships among precipitation levels, growing season lengths, and potential agricultural yield in that country. The study begins by determining monthly dependable precipitation levels and mean annual rainfall at 57 different locations in Senegal. Next, a mathematical model is used to predict growing season length for various rainfed crops. The selection of crops climatically suited to Senegal is then assessed, and the country is divided into six zones with fairly uniform climates and moisture regimes.

2E. Animal Husbandry

512,711

PB85-129815/GAR PC **A07**/MF **A01**
Niger Range and Livestock Project, Tahoua.
Ngaynaaka: Herding According to the Wodaabe.
Discussion paper,
A. B. Maliki. Nov 81, 126p DP-2, AID-PN-AAL-115

There is an inextricable bond between the Wodaabe, a traditional pastoral people in Central Niger, and their cattle. This report provides an introduction to the herding practices of the Wodaabe. First, a general overview is given of herd composition and management, basic techniques related to the gestation and birth of a calf, and an introduction to the Wodaabe's general knowledge of 71 forage crops and 65 animal diseases. The second part gives a more detailed analysis of economic, and social implications of Wodaabe animal husbandry practices, traditional herding strategies, and the close relationship of the herd to many phases of social life.

512,712

PB85-136299/GAR PC **A03**/MF **A01**
Niger Range and Livestock Project, Tahoua.
Types de Maladies Animales dans la Region du Projet Gestion des Paturages et Elevage de la Zone Pastorale du Niger (Types of Animal Illnesses in the Area of the Niger Range and Livestock Project).
Discussion paper,
A. E. Sollod. Nov 81, 35p DP-4, AID-PN-AAL-747
Text in French.

In the region of the Niger Range and Livestock Project, livestock diseases are affected by seasonal changes. A study of these diseases, herein reported, was conducted in two phases; the first during the dry season, under difficult conditions of insufficient food and water, high temperatures, and long forced marches in search of pasturage and water; the second phase during the rainy season under more favorable conditions. Some 24 diseases as well as infestations of internal and external parasites are described.

512,713

PB85-920800/GAR Subscription
Food and Drug Administration, Rockville, MD.
FDA (Food and Drug Administration) Compliance Program Guidance Manual and Updates (FY 85). Section 3. Veterinary Medicine.
Irregular repts.
1985, 1p
Supersedes PB84-920800.Portions of this document are not fully legible.
Paper copy available on subscription, North American Continent price $45.00/year; all others write for quote. Updates also available in single copies. Basic manual available individually as PB85-920899.

The FDA Compliance Program Guidance Manual provides a system for issuing and filing written program

plans and instructions directed to Food and Drug Administration Field operations for project implementation. Section III provides those chapters of the Compliance Program Guidance Manual which pertain to the areas of veterinary medicine. Some of the areas of coverage include veterinary drug production quality, New Animal Drug Application (NADA) pre-approval inspection, medicated feeds, chemical contaminants in animal feeds, and consumer education of veterinary medicine programs.

512,714
PB85-920699/GAR PC A09
Food and Drug Administration, Rockville, MD.
FDA (Food and Drug Administration) Compliance Program Guidance Manual (FY 85). Section 3. Veterinary Medicine.
1985, 178p FDA/OMO-85/16C
Supersedes PB84-920699. Updates and basic manual available on subscription as PB85-920800.

The FDA Compliance Program Guidance Manual provides a system for issuing and filing written program plans and instructions directed to Food and Drug Administration Field operations for project implementation. Section III provides those chapters of the Compliance Program Guidance Manual which pertain to the areas of veterinary medicine. Some of the areas of coverage include veterinary drug production quality, New Animal Drug Application (NADA) pre-approval inspection, medicated feeds, chemical contaminants in animal feeds, and consumer education of veterinary medicine programs.

2F. Forestry

512,715
DE85000900/GAR PC A02/MF A01
Oak Ridge National Lab., TN.
Use of an Ecosystem Model for Testing Ecosystem Response to Inaccuracies of Root and Microflora Productivity Estimates.
H. Petersen, R. V. O'Neill, and R. H. Gardner. 1984, 22p CONF-8404204-1
Contract AC05-84OR21400
British Ecological Society meeting, London, UK, 1 Apr 1984.
Portions are illegible in microfiche products.

A seventy-compartment model for a Danish beech forest ecosystem is described in outline. The unmodified model predicts considerable accumulation of wood litter and decreasing accumulation through secondary to final decomposition products. Increment rates are similar for all components of the detritus based food chain. Modification of fine root production rate produces strong, positive response for root litter, and less, but still significant, response for detritus, humus and the components of the decomposer food chain. Increase of microbial biomass with adjustments of metabolism and production causes reduced accumulation of detritus and humus. The soil organisms respond according to food source. The use of the model for testing the sensitivity of the ecosystem to inaccuracies of root- and microflora estimates is discussed. 21 references, 3 figures, 1 table. (ERA citation 10:003310)

512,716
DE85001001/GAR PC A02/MF A01
Georgia Univ. Research Foundation, Inc., Athens.
Mineral Cycling in Soil and Litter Arthropod Food Chains. Annual Progress Report and Incremental Funding Request.
D. A. Crossley. 26 Sep 84, 5p DOE/EV/00641-52
Contract AS09-76EV00641
Portions are illegible in microfiche products.

Relationships have been investigated between soil fauna, soil microbes and the decomposition process. Progress is reported in measuring the stimulatory effect of soil arthropod activities upon microbial immobilization of nutrient elements and other elements, and in evaluating the effects of arthropod feeding upon decomposition rates of unconfined leaf litter. (ERA citation 10:003311)

512,717
DE85002325/GAR PC A02/MF A01
Oak Ridge National Lab., TN.
Combined Effects of Atmospheric Deposition, Internal Acid Production, and Harvesting on Nutrient Gains and Losses from Forest Ecosystems.
D. W. Johnson, and D. D. Richter. 1984, 9p CONF-8409153-3
Contract AC05-84OR21400
TAPPI research and development conference, Appleton, WI, USA, 30 Sep 1984.
Portions are illegible in microfiche products.

Atmospheric deposition can cause nutrient gains (N, S) or losses (Ca, Mg, K) from forest ecosystems, whereas harvesting causes only losses. Available data indicate that S deposition in polluted regions greatly exceeds S export via whole-tree harvesting, but this is not normally the case for N. Both atmospheric acid deposition (in concert with internal acid production) and harvesting can cause the loss of base cations, but because of tree selectivity in cation uptake, it appears that harvesting will have a greater impact on the export of scarce or limiting cations than will acid deposition or internal acid generation. However, nutrient losses via harvesting can be minimized by timing harvests and losses can be compensated for by proper fertilization under intensive management regimes. 6 references, 3 tables. (ERA citation 10:003314)

512,718
PB85-133367/GAR PC A07/MF A01
MITRE Corp., McLean, VA. METREK Div.
Fuelwood Supply for Managua, Nicaragua Sustainable Alternatives for the Las Maderas Fuelwood Supply Region,
W. Park, L. C. Newman, and K. Ford. May 82, 150p MTR-81W285, AID-PN-AAL-280
Sponsored by Centro Agronomico Tropical de Investigacion y Ensenanza, Turrialba (Costa Rica).

This is a preliminary investigation of the fuelwood supply for Managua, Nicaragua, with particular emphasis on the supplies emanating from the area to the Northeast of Managua around the town of Las Maderas. The study assesses the effect of fuelwood harvesting in this area, characterizes the commercial fuelwood industry active between Las Maderas and Managua, and makes a preliminary estimate of the fuelwood supply and demand relationship between the Las Maderas region and Managua.

512,719
PB85-137974/GAR PC A03/MF A01
Agency for International Development, Washington, DC.
Tree Seed and Other Plant Materials Aspects of U.S. AID (Agency for International Development)-Supported Reforestation Projects,
T. E. Greathouse. 19 Feb 82, 46p AID-PN-AAL-730

While the cost of tree seed is much less than 1% of the total cost of a reforestation project, using seed which is inherently capable of producing maximum yields in a given environment is crucial in determining such a project's success or failure. This report discusses the use of tree seeds and other reproductive materials as an integral part of A.I.D. reforestation projects. A.I.D. forestation goals are discussed and the magnitude of reforestation projects is described in terms of location, funding, quantity of trees planted, and the costs and quantities of seed. Next, factors determining the availability of tree seed or clonal material are examined, with emphasis on supply and demand; the need for long-term planning to procure the best seed; and special considerations in procuring high-risk clonal materials. Seed suppliers - commercial, government, quasi-government, exporters, and intermediaries - are briefly described, and the role of local seed production is explored. The authors proceed to highlight project variables other than seeds, e.g., sociocultural factors and nursery conditions. Lastly, local and overseas seed procurement problems are reviewed.

3. ASTRONOMY AND ASTROPHYSICS

3A. Astronomy

512,720
N85-12833/8/GAR PC A02/MF A01
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Algorithm for Astronomical, Extended Source, Signal-to-Noise Radio Calculations.
R. R. Jayroe. Nov 84, 23p NAS 1.60:2396, NASA-TP-2396

An algorithm was developed to simulate the expected signal-to-noise ratio as a function of observation time in the charge coupled device detector plane of an optical telescope located outside the Earth's atmosphere for an extended, uniform astronomical source embedded in a uniform cosmic background. By choosing the appropriate input values, the expected extended source signal-to-noise ratios can be computed for the Hubble Space Telescope using the Wide Field/Planetary Camera science instrument.

512,721
N85-12834/6/GAR PC A03/MF A01
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Algorithm for Astronomical, Point Source, Signal to Noise Ratio Calculations.
R. R. Jayroe, and D. J. Schroeder. Nov 84, 40p NAS 1.60:2397, NASA-TP-2397

An algorithm was developed to simulate the expected signal to noise ratios as a function of observation time in the charge coupled device detector plane of an optical telescope located outside the Earth's atmosphere for a signal star, and an optional secondary star, embedded in a uniform cosmic background. By choosing the appropriate input values, the expected point source signal to noise ratio can be computed for the Hubble Space Telescope using the Wide Field/Planetary Camera science instrument.

3B. Astrophysics

512,722
DE85002187/GAR PC A03/MF A01
Fermi National Accelerator Lab., Batavia, IL.
Cosmology with Decaying Particles.
M. S. Turner. Sep 84, 27p FNAL/Pub-84/89-A
Contract AC02-76CH03000

We consider a cosmological model in which an unstable massive relic particle species (denoted by X) has an initial mass density relative to baryons beta exp -1 identically equal rho/sub X//rho/sub B/ >> 1, and then decays recently (redshift z less than or equal to 1000) into particles which are still relativistic today (denoted by R). We write down and solve the coupled equations for the cosmic scale factor a(t), the energy density in the various components (rho/sub X/, rho/sub R/, rho/sub B/), and the growth of linear density perturbations (delta rho/rho). The solutions form a one parameter (beta) family of solutions; physically beta exp -1 approx. = (omega /sub R// omega /sub NR/) x (1 + z/sub D/) = (ratio today of energy density of relativistic to nonrelativistic particles) x (1 + redshift of (decay)). We discuss the observational implications of such a cosmological model and compare our results to

earlier results computed in the simultaneous decay approximation. In an appendix we briefly consider the case where one of the decay products of the X is massive and becomes nonrelativistic by the present epoch. 21 references. (ERA citation 10:003545)

512,723
DE85002188/GAR PC A02/MF A01
Princeton Univ., NJ. Dept. of Physics.
Cosmological Production of Kaluza-Klein Monopoles.
J. A. Harvey, E. W. Kolb, and M. J. Perry. Sep 84, 9p FNAL/Pub-84/95-A
Contract AC02-76CH03000
Portions are illegible in microfiche products.

The cosmological production of Kaluza-Klein monopoles is discussed. The present monopole to entropy ratio is calculated in some simple models with the conclusion that this ratio is unacceptably large unless additional mechanisms for entropy production or monopole annihilation are present. (ERA citation 10:003548)

512,724
DE85002189/GAR PC A02/MF A01
Fermi National Accelerator Lab., Batavia, IL.
Wall Dominated Inflation.
D. Seckel. Sep 84, 19p FNAL/Pub-84/92-4
Contract AC02-76CH03000

The possibility that a wall dominated phase, during which S approx. t exp 2 , could solve the horizon and flatness problems is examined. It is difficult to do this and still have a homogenous universe at the time of nucleosynthesis. The issues of baryogenesis, the monopole problem, and density fluctuations are also discussed. In order to gracefully exit the wall dominated phase it is proposed that the walls decay via hole formation. The details of that process are discussed. (ERA citation 10:003547)

512,725
DE85002190/GAR PC A02
Fermi National Accelerator Lab., Batavia, IL.
Lepton-Number Violation in Cosmology and Astrophysics.
E. W. Kolb. Sep 84, 11p FNAL/C-84/90-A
Contract AC02-76CH03000
Paper copy only, copy does not permit microfiche production.

The cosmological and astrophysical implications of lepton number violation are discussed. The lepton number violation considered is due to the interactions of neutrinos with Nambu-Goldstone bosons. (ERA citation 10:005627)

512,726
DE85002191/GAR PC A02/MF A01
Chicago Univ., IL. Astronomy and Astrophysics Center.
Decaying Particles Do Not Heat Up the Universe.
R. J. Scherrer, and M. S. Turner. Sep 84, 15p FERMILAB-Pub-84/94
Contract AC02-76CH03000
Portions are illegible in microfiche products.

It is usually assumed that a massive relic species, which comes to dominate the mass density of the Universe and later decays, heats up the Universe when the age of the Universe approx. = its lifetime. We show that if its decay follows the usual exponential decay law, then the Universe is never reheated, rather it tust cools more slowly. We calculate the evolution of the temperature and entropy, and find that to within numerical factors of order unity, the usual estimates for the entropy increase are found to be correct. Our results have implications for primordial nucleosynthesis in scenarios where a massive relic with lifetime approx. = 10 exp -2 to 10 exp 3 sec is present, and for baryogenesis in the new inflationary Universe scenario. (ERA citation 10:003544)

512,727
DE85002192/GAR PC A02/MF A01
Fermi National Accelerator Lab., Batavia, IL.
Recent Heavy Particle Decay in a Matter Dominated Universe.
K. A. Olive, D. Seckel, and E. Vishniac. Sep 84, 20p FERMILAB-Pub-84/86-A
Contract AC02-76CH03000

The cold matter scenario for galaxy formation solves the dark matter problem very nicely on small scales corresponding to galaxies and clusters of galaxies. It is, however, difficult to reconcile with a Universe with an Einstein-deSitter value of omega = 1. We will show here that cold matter and omega = 1 can be made compatible while retaining the feature that the Universe is matter dominated today. This is done by means of heavy (cold) particles whose decay subsequently leads to the unbinding of a large fraction of lighter clustered matter. 33 references. (ERA citation 10:003543)

512,728
DE85002207/GAR PC A03/MF A01
Los Alamos National Lab., NM.
Global Aspects of Stream Evolution in the Solar Wind.
J. T. Gosling. 1984, 34p LA-UR-84-3230, CONF-8408121-1
Contract W-7405-ENG-36
American Institute of Physics conference, Taos, NM, USA, 6 Aug 1984.

A spatially variable coronal expansion, when coupled with solar rotation, leads to the formation of high speed solar wind streams which evolve considerably with increasing heliocentric distance. Initially the streams steepen for simple kinematic reasons, but this steepening is resisted by pressure forces, leading eventually to the formation of forward-reverse shock pairs in the distant heliosphere. The basic physical processes responsible for stream steepening an evolution are explored and model calculations are compared with actual spacecraft observations of the process. The solar wind stream evolution problem is relatively well understood both observationally and theoretically. Tools developed in achieving this understanding should be applicable to other astrophysical systems where a spatially or temporally variable outflow is associated with a rotating object. 27 references, 13 figures. (ERA citation 10:003550)

512,729
DE85002716/GAR PC A02/MF A01
Stanford Linear Accelerator Center, CA.
Old and New Neutron Stars.
M. Ruderman. Sep 84, 19p SLAC-PUB-3458, CONF-8410178-1
Contract AC03-76SF00515
Cornell symposium on new directions in astrophysics, Ithaca, NY, USA, 3 Oct 1984.
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The youngest known radiopulsar in the rapidly spinning magnetized neutron star which powers the Crab Nebula, the remnant of the historical supernova explosion of 1054 AD. Similar neutron stars are probably born at least every few hundred years, but are less frequent than Galactic supernova explosions. They are initially sources of extreme relativistic electron and/or positron winds (approx.10 exp 38 s exp -1 of 10 exp 12 eV leptons) which greatly decrease as the neutron stars spin down to become mature pulsars. After several million years these neutron stars are no longer observed as radiopulsars, perhaps because of large magnetic field decay. However, a substantial fraction of the 10 exp 8 old dead pulsars in the Galaxy are the most probable source for the isotropically distributed gamma -ray burst detected several times per week at the earth. Some old neutron stars are spun-up by accretion from companions to be resurrected as rapidly spinning low magnetic field radiopulsars. 52 references, 6 figures, 3 tables. (ERA citation 10:003567)

512,730
N85-12587/0/GAR PC A02/MF A01
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Documentation for the Machine-Readable Version of a Catalogue of Extragalactic Radio Source Identifications (Veron-Cetty and Veron 1983).
W. H. Warren. Nov 83, 19p NAS 1.15:87373, NSSDC/WDC-A-R/S-83-12, NASA-TM-87373

Detailed descriptions of the data and reference files of the updated and final version of the machine-readable catalog are given. The computerized catalog has greatly expanded since the original published version (1974), and additional information is given. A separate reference file contains bibliographical citations ordered simultaneously by numerical reference and alphabetically by author.

512,731
N85-12588/8/GAR PC A02/MF A01
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Documentation for the Machine-Readable Version of the Revised AFGL Infrared Sky Survey Catalog (Price and Murdock 1983).
W. H. Warren. May 84, 21p NAS 1.15:87377, NSSDC/WDC-A-R/S-84-05, NASA-TM-87377

A detailed description of the machine-readable catalog as it is currently being distributed from the Astronomical Data Center is given. The catalog contains a main data file of 2970 sources and a supplemental file of 3176 sources measured at wavelengths of 4.2, 11, 20 and 27 microns.

512,732
N85-12589/6/GAR PC A02/MF A01
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Documentation for the Machine-Readable Version of the ANS Ultraviolet Photometry Catalogue of Point Sources (Wesselius et al 1982).
W. H. Warren. Aug 84, 16p NAS 1.15:87379, NSSDC/WDC-A-R/S-84-10, NASA-TM-87379

The machine-readable version of the Astronomical Netherlands Satellite ultraviolet photometry catalog is described in detail, with a byte-by-byte format description and characteristics of the data file given. The catalog is a compilation of ultraviolet photometry in five bands, within the wavelength range 155 nm to 330 nm, for 3573 mostly stellar objects. Additional cross reference data (object identification, UBV photometry and MK spectral types) are included in the catalog.

512,733
N85-12832/0/GAR PC A02/MF A01
Minnesota Univ., Minneapolis.
Spectral Components at Visual and Infrared Wavelengths in Active Galactic Nuclei.
W. A. Stein, A. T. Tokunaga, and R. J. Rudy. 1984, 18p NAS 1.26:174133, NASA-CR-174133
Contract NASW-3159

Aperture-dependent infrared photometry of active galactic nuclei are presented which illustrate the importance of eliminating starlight of the galaxy in order to obtain the intrinsic spectral distribution of the active nuclei. Separate components of emission are required to explain the infrared emission with a spectral index of alpha approx = 2 and the typical visual-ultraviolet continuum with alpha approx = 0.3 (where F(nu) varies as nu(sup-alpha). Present evidence does not allow unique determination of the appropriate mechanisms, but the characteristics of each are discussed.

512,734
N85-12835/3/GAR PC A03/MF A01
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Infrared Study of the Bi-Polar Outflow Region GGD 12-15.
P. M. Harvey, B. A. Wilking, M. Joy, and D. F. Lester. Oct 84, 29p NAS 1.15:86655, REPT-85017, NASA-TM-86655

Infrared observations from 1 to 100 microns are presented for the region associated with a bipolar CO outflow source near the nebulous objects GGD 12 to 15. A luminous far-infrared source was found associated with a radio-continuum source in the area. This object appears to be a compact HII region around a nearly main-sequence BO star. A faint 20 micron source was also discovered at the position of an H2O maser 30 deg northwest of the HII region. This object appears to be associated with but not coincident with a 2 micron reflection nebula. This structure serves as evidence for a non-spherically symmetric, possibly disk-like dust distribution around the exciting star for the maser. This object probably powers the bi-polar CO outflow although its luminosity is less than 10% that of the star which excites the compact HII region. A number of other 2 micron sources found in the area are probably members of a recently formed cluster.

512,735
N85-12836/1/GAR PC A03/MF A01
Arizona Univ., Tucson.

Jovian Atmospheric Window at 2.7 Microns: A Search for H2S.
H. P. Larson, D. S. Davis, R. Hofmann, and G. L. Bjoraker. Nov 84, 50p NAS 1.15:86661, REPT-85043, NASA-TM-86661

The atmospheric transmission window at 2.7 microns in Jupiter's atmosphere was observed at a spectral resolution of 0.1/cm from the Kuiper Airborne Observatory. From an analysis of the CH4 abundance (80 m-am) and the H2O abundance (0.0125 cm-am) it was determined that the penetration depth of solar flux at 2.7 microns is near the base of the NH3 cloud layer. The upper limit to H2O at 2.7 microns and other results suggest that photolytic reactions in Jupiter's lower troposphere may not be as significant as was previously thought. A search for H2S in Jupiter's atmosphere yielded an upper limit of 0.1 cm-am. The corresponding limit to the element abundance ratio S/H was approx. 1.7x10(-8), about 10(-3) times the solar value. Upon modeling the abundance and distribution of H2S in Jupiter's atmosphere it was concluded that, contrary to expectations, sulfur-bearing chromophores are not present in significant amounts in Jupiter's visible clouds. Rather, it appears that most of Jupiter's sulfur is locked up as NH4SH in a lower cloud layer. Alternatively, the global abundance of sulfur in Jupiter may be significantly depleted.

512,736
N85-12839/5/GAR **PC A02/MF A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
X-Ray Observations of the Seyfert 1 Galaxies AKN 120 and MCG8-11-11.
R. F. Mushotzky, and F. E. Marshall. Mar 80, 21p NAS 1.15:80663, NASA-TM-80663
Previously Announced as A80-49367. Submitted for Publication.

A new X-ray source, H0523-00, with the optically variable Seyfert 1 galaxy AKN 120 is identified. The source has a 2-10 keV X-ray flux of 2 x 10 to the -11th ergs/sq cm s which corresponds to a 2-10 keV X-ray luminosity of 10 to the 44th ergs/s. X-ray observations over a 1.5 year time span combined with contemporaneous optical photometry show a decrease in the optical with no corresponding decrease in the X-ray. In contrast, similar observations of MCG 8-11-11 show a contemporaneous decrease in optical and X-ray fluxes. It is noted that the infrared and X-ray spectral slopes for these two objects are similar, with the optical being steeper by roughly one unit.

512,737
N85-12840/3/GAR **PC A02/MF A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Syntheses of the X-Ray Background with Power-Law Sources.
G. Dezotti, E. A. Boldt, A. Cavaliere, L. Danese, and A. Franceschini. Aug 81, 22p NAS 1.15:82173, NASA-TM-82173
Previously Announced as A82-25055. Submitted for Publication.

The conditions under which the combined emission from power law sources can mimic the X-ray background (XRB) spectrum in the 3-50 keV range are considered in view of HEAO 1 A-2 experiment measurements, and it is confirmed that a good fit may be obtained. The required spectral properties of the component sources differ, however, from those observed for local active galactic nuclei. Constraints are deduced for both the low luminosity extension and evolution of such local objects, and it is shown that any other class of sources contributing to the X-ray background must be characterized by an energy spectral index lower than about 0.4, which is the mean index of the XRB, and exhibit steeper spectra at higher energies.

512,738
N85-12841/1/GAR **PC A03/MF A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Large Scale Height Galactic Component of the Diffuse 2-60 Kev Background.
D. Iwan, F. E. Marshall, E. A. Boldt, R. F. Mushotzky, and R. A. Shafer. Mar 82, 47p NAS 1.15:83837, NASA-TM-83837
Previously Announced as A84-42687. Submitted for Publication.

The diffuse 2-60 keV X-ray background has a galactic component clearly detectable by its strong variation with both galactic latitude and longitude. This galactic component is typically 10 percent of the extragalactic background toward the galactic center, half that strong toward the anticenter, and extrapolated to a few percent of the extragalactic background toward the galactic poles. It is acceptably modeled by a finite radius emission disk with a scale height of several kiloparsecs. The averaged galactic spectrum is best fitted by a thermal spectrum of kT about 9 keV, a spectrum much softer than the about 40 keV spectrum of the extragalactic component. The most likely source of this emission is low luminosity stars with large scale heights such as subdwarfs. Inverse Compton emission from GeV electrons on the microwave background contributes only a fraction of the galactic component unless the local cosmic ray electron spectrum and intensity are atypical.

512,739
N85-12842/9/GAR **PC A03/MF A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
X-Ray Spectrum and Time Variability of Narrow Emission Line Galaxies.
R. F. Mushotzky. Nov 81, 41p NAS 1.15:83859, NASA-TM-83859
Previously Announced as A82-31356. Submitted for Publication.

X-ray spectral and temporal observations are reported for six narrow emission line galaxies (NELGs), all of which are fitted by power-law X-ray spectra of energy slope 0.8 and have column densities in the line of sight greater than 1 x 10 to the 22nd atoms/sq cm. Three of the objects, NGC 526a, NGC 2110 and MCG-5-23-16 are variable in their X-ray flux, and the latter two, along with NGC 5506 and NGC 7582, showed detectable variability in at least one observation. The measured X-ray properties of these NELGs, which also included NGC 2992, strongly resemble those of previously-measured type 1 Seyferts of the same X-ray luminosity and lead to the conclusion of great similarity between the NELGs and low-luminosity type 1 Seyferts. The implications of these observations for the optical line-emitting region structure of these galaxies are discussed.

512,740
N85-12843/7/GAR **PC A02/MF A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Einstein Solid State Spectrometer Observation of the Peculiar Red Dwarf Wolf 630 AB.
J. H. Swank, and H. M. Johnson. Jun 82, 18p NAS 1.15:83947, NASA-TM-83947
Previously Announced as A82-41999. Submitted for Publication.

Wolf 630 AB is a double and perhaps triple star with a predominant dM 3.5e spectrum. It is one of the relatively strong red dwarf X-ray sources. The 0.5 to 4 keV spectral data for a steady, non-flaring flux are interpreted in terms of emission from thin thermal plasma with a dominant temperature of approximately 6,500,000 K. Both in temperature and average surface flux the quiescent corona is similar to that of the low temperature component found for RS Canum Venaticorum binaries. There is an indication of additional emission above 10 to the 7th power K, but the ratio of high to low temperature emission is smaller than for typical RS CVn systems. The solid state spectrometer observed the spectrum of only one other red dwarf, Ad Leo, which is very similar to that observed for Wolf 630 AB.

512,741
N85-12844/5/GAR **PC A04/MF A01**
Royal Inst. of Tech., Stockholm (Sweden). Institutionen foer Plasmafysik.
Space Research and the New Approach to the Mechanics of Fluid Media in Cosmos.
H. Alfven, and F. Cech. Jul 84, 67p TRITA-EPP-84-04
Sponsored by Swedish Natural Science Research Council. Presented at 16TH Intern. Congr. Of Theoret. And Appl. Mech. Lingry, Denmark, 19-25 Aug. 1984 and Plasma Astrophys. Course and Workshop, Varenna, Italy 28 Aug.-7 Sep. 1984.

The contribution of spacecraft hardware to astronomy and astrophysics is discussed. Data from infrared, ultraviolet, X-ray and gamma ray instruments revealed that the cosmic environment consists, almost totally, of magnetized, often dusty, plasma. In situ measurements in the magnetospheres - including heliosphere - combined with laboratory experiments gave information about the properties of cosmic plasmas which makes necessary a drastic revision of the classical theory of plasmas. The results are applied to cosmogony. Magnetospheric physics has matured to such an extent that it is possible to treat certain aspects of cosmogony as an extrapolation of magnetospheric physics. It is shown that certain events 4 to 5 billion years ago can be reconstructed with an accuracy of a few percent.

512,742
N85-12847/8/GAR **PC A02/MF A01**
Massachusetts Univ., Amherst.
Martian Impact Basins: Morphology Differences and Tectonic Provinces.
M. Stam, P. M. Schultz, and G. E. Mcgill. Aug 84, 2p NAS 1.26:174074, LPI-CONTRI-537, NASA-CR-174074
Contract NASW-3389

Detailed geomorphic and structural mapping of five Martian basins and preliminary study of eleven other basins reveal four characteristic styles of modification that relate to the degree and age of past tectonic activity. Within regions that exhibit no evidence for tectonic activity, the modification style can be used to distinguish areas dominated by different exogenic processes. A framework for understanding these different styles of basin modification is provided.

512,743
N85-12848/6/GAR **PC A02/MF A01**
Houston Univ., TX.
Multispectral and Geomorphic Studies of Processed Voyager 2 Images of Europa.
T. A. Meier. Aug 84, 2p NAS 1.26:174075, LPI-CONTRI-537, NASA-CR-174075
Contract NASW-3389
Presented at the 47TH Ann. Meteoritical Society Meeting, 30 Jul. - 2 Aug. 1984.

High resolution images of Europa taken by the Voyager 2 spacecraft were used to study a portion of Europa's dark lineations and the major white line feature Agenor Linea. Initial image processing of images 1195J2-001 (violet filter), 1198J2-001 (blue filter), 1201J2-001 (orange filter), and 1204J2-001 (ultraviolet filter) was performed at the U.S.G.S. Branch of Astrogeology in Flagstaff, Arizona. Processing was completed through the stages of image registration and color ratio image construction. Pixel printouts were used in a new technique of linear feature profiling to compensate for image misregistration through the mapping of features on the printouts. In all, 193 dark lineation segments were mapped and profiled. The more accurate multispectral data derived by this method was plotted using a new application of the ternary diagram, with orange, blue, and violet relative spectral reflectances serving as end members. Statistical techniques were then applied to the ternary diagram plots. The image products generated at LPI were used mainly to cross-check and verify the results of the ternary diagram analysis.

512,744
N85-12849/4/GAR **PC A02/MF A01**
New York Univ., NY.
Martian Climate: Energy Balance Models with CO2/H2O Atmospheres.
Semiannual Status Report, 1 Mar. - 1 Sep. 1984.
M. I. Hoffert. 1 Sep 84, 11p NAS 1.26:174073, NASA-CR-174073
Contract NAGW-573

Progress in the development of a multi-reservoir, time dependent energy balance climate model for Mars driven by prescribed insolation at the top of the atmosphere is reported. The first approximately half-year of the program was devoted to assembling and testing components of the full model. Specific accomplishments were made on a longwave radiation code, coupling seasonal solar input to a ground temperature simulation, and conceptualizing an approach to modeling the seasonal pressure waves that develop in the Martian atmosphere as a result of sublimation and condensation of CO2 in polar regions.

512,745
N85-12850/2/GAR **PC A04/MF A01**
Stanford Univ., CA.

Magnetohydrodynamic and Gasdynamic Theories for Planetary Bow Waves.
J. R. Spreiter, and S. S. Stahara. 1984, 71p NAS 1.26:174132, NASA-CR-174132
Contract NAGW-2781

The observed properties of bow waves and the associated plasma flows are outlined, along with those features identified that can be described by a continuum magnetohydrodynamic flow theory as opposed to a more detailed multicomponent particle and field plasma theory. The primary objectives are to provide an account of the fundamental concepts and current status of the magnetohydrodynamic and gas dynamic theories for solar wind flow past planetary bodies. This includes a critical examination of: (1) the fundamental assumptions of the theories; (2) the various simplifying approximations introduced to obtain tractable mathematical problems; (3) the limitations they impose on the results; and (4) the relationship between the results of the simpler gas dynamic-frozen field theory and the more accurate but less completely worked out magnetohydrodynamic theory. Representative results of the various theories are presented and compared. A number of deficiencies, ambiguities, and suggestions for improvements are discussed, and several significant extensions of the theory required to provide comparable results for all planets, their satellites, and comets are noted.

512,746
N85-12851/0/GAR PC **A03**/MF **A01**
Smithsonian Astrophysical Observatory, Cambridge, MA.
Studies of the Chemistry of Vibrationally and Electronically Excited Species in Planetary Upper Atmospheres.
Final Report, 1 Oct. 1983 - 30 Sep. 1984.
J. L. Fox. Nov 84, 30p NAS 1.26:174134, NASA-CR-174134
Contract NAGW-506

The vibrational distribution of O2(+) in the atmospheres of Venus and Mars was investigated to compare with analogous values in the Earth's atmosphere. The dipole moment of the Z(2) Pi sub u - X(2) Pi sub g transition of O2(+) is calculated as a function of internuclear distance. The band absorption oscillator strengths and band transition probabilities of the second negative system are derived. The vibrational distribution of O2(+) in the ionosphere of Venus is calculated for a model based on data from the Pioneer Venus neutral mass spectrometer.

512,747
N85-12855/1/GAR PC **A03**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Cosmic Ray Propagation in the Local Superbubble.
R. E. Steitmatter, V. K. Balasubrahmanyan, R. J. Protheroe, and J. F. Ormes. Sep 84, 32p NAS 1.15:85030, NASA-TM-85030
Submitted for Publication.

It is suggested that a ring of HI gas lying in the galactic plane is part of a supershell which formed some 3 x to the 7th power years ago. The consequences of a closed magnetic supershell for cosmic ray propagation are examined and it is concluded that there is no evidence which precludes the production and trapping of cosmic rays in such a region. A consequence of superbubble confinement is that the mean age of cosmic rays would be independent of energy. This can be tested by high energy observations of the isotopic composition of Be.

512,748
PB85-138931/GAR PC **E09**/MF **E09**
Science and Engineering Research Council, Chilton (England). Rutherford Appleton Lab.
Rutherford Appleton Laboratory Workshop on Astronomy and Astrophysics: Gas in the Interstellar Medium,
P. M. Gondhalekar. c1984, 185p RAL-84-101

Contents: The diffuse interstellar medium in the Magellanic Clouds; Molecular chemistry and the chemical evolution of interstellar medium; Cosmic gamma rays and the mass of molecular hydrogen in the Galaxy; Chemical enrichment and the evolution of interstellar medium; Abundances of elements in the gas-phase of ISM; H II regions in the Galaxy and Magellanic Clouds; Chemical abundances in the planetary nebulae in Galaxy and in the Magellanic Clouds; Stellar winds in the interstellar medium; The halo of the 30 Doradus nebula; Interaction of supernovae with the interstellar medium; The production of X-rays in supernova remnants; Radio observations of supernova remnants; Supernova remnants as probes of the interstellar medium.

512,749
PB85-139145/GAR PC **A06**/MF **A01**
National Geophysical Data Center, Boulder, CO.
Solar-Geophysical Data Number 481, September 1984. Part 1 (Prompt Reports). Data for August 1984, July 1984 and Late Data.
Sep 84, 102p SGD-481-PT-1, NOAA-84120701
Contract NASA-W-15, Grant NSF-ATM83-1491
See also PB85-139152, and PB85-112068. Library of Congress catalog card no. 79-640375.

Contents: Detailed index for 1984; Data for August 1984--(IUWDS Alert Periods (advance and worldwide); solar activity indices, Solar flares, Solar radio emission, Mean solar magnetic field, Boulder geomagnetic substorm log); Data for July 1984--(Solar active regions, Sudden ionospheric disturbances, Solar radio spectral observations, Cosmic ray measurements by neutron monitor, Geomagnetic indices, Radio propagation indices); Late data--(Geomagnetic indices June 1984, Pioneer XII interplanetary magnetic field magnitudes).

512,750
PB85-139152/GAR PC **A05**/MF **A01**
National Geophysical Data Center, Boulder, CO.
Solar-Geophysical Data Number 481, September 1984. Part 2 (Comprehensive Reports). Data for March 1984, October 1981 and Miscellanea.
Sep 84, 84p SGD-481-PT-2, NOAA-84120702
Contract NASA-W-15, Grant NSF-ATM83-1491
See also PB85-139145, and PB85-112076. Library of Congress catalog card no. 79-640375.

Contents: Detailed index for 1984; Data for March 1984--(Solar radio bursts at fixed frequencies, Solar x-ray radiation from GOES satellite, Mass ejections from the sun, Active prominences and filaments); Data for October 1981--(Solar flares October 1981, Number of flares August 1966 - October 1981).

512,751
PB85-142578 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Models for the Active and Quiescent Regions on the RS CVn-Type System 2 Pegasi (HD 224085).
Final rept.,
J. L. Linsky, A. Brown, N. C. Marstad, M. Rodono, and A. D. Andrews. Jul 84, 4p
Grant NAG5-82
Pub. in Proceedings of European IUE Conference (4th), Rome, Italy, May 15-18, 1984, ESA SP-218, p351-354 Jul 84.

IUE observations of the RS CVn binary system II Pegasi obtained during the period 1981 October 1-7 have been used by Marstad to deduce the presence of a compact bright active region covering less than 10% of the primary's visible hemisphere. These same observations have not been used to derive the emission measure distributions and to calculate transition region models of the quiescent and plage (active) regions of II Peg. Active region models have been calculated assuming area coverages of 10, 6, 3 and 1% of the visible hemisphere. These models are used to provide lower limits to the electron pressure in the quiescent and plage regions, which are compared with the available density diagnostics. The amount of mechanical energy deposition required to account for the observed radiative losses is very large.

512,752
PB85-142586 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
High-Resolution, Far-Ultraviolet Study of Beta Draconis (G2 Ib-II): Transition Region Structure and Energy Balance.
Final rept.,
A. Brown, C. Jordan, R. E. Stencel, J. L. Linsky, and T. R. Ayres. 15 Aug 84, 14p
Grants NAG5-82, NGL-06-003-057
Sponsored in part by Grants NAG5-199 and NAS5-26409.
Pub. in Astrophysical Jnl. 283, p731-744, 15 Aug 84.

High resolution far-ultraviolet spectra of the star beta Draconis have been obtained with the International Ultraviolet Explorer satellite. The observed emission-line fluxes have been used to derive the mean emission measure distribution, which is used to construct models of the density and temperature variation with height as a function of the transition region pressure. The range of appropriate pressures is investigated from density-sensitive line ratios and through arguments concerning line opacities.

512,753
PB85-145183 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Io: Energy Constraints and Plume Volcanism.
Final rept.,
R. T. Reynolds, S. J. Peale, and P. Cassen. 1980, 6p
Pub. in Icarus 44, n2 p234-239 1980.

Observational and theoretical considerations support a model of Io which features a surface layer of sulfur overlying an active silicate crust. Such a model would imply frequent contact between silicate magma intrusions and the sulfur layer. This contact would produce volcanic plumes driven by high temperature sulfur vapor. The model meets observational constraints for a wide range of possible conditions in contrast to the special conditions required for plume generation by SO2. Characteristics of the two models are compared, and it is suggested that high spatial resolution infrared radiometry could identify the driving volatile.

512,754
PB85-147320 Not available NTIS
National Bureau of Standards (NEL), Boulder, CO.
Eruptive Binaries, 11. Disk-Radius Variations in U Gem.
Final rept.,
J. Smak. 1984, 4p
Pub. in Acta Astronomica, n1 p93-96 1984.

New set of geometrical elements is determined from an improved analysis of eclipses of the hot spot. The radius of the disk, which expands during an outburst, shrinks exponentially from about (r sub d) = 0.39 immediately after outburst to about (r sub d) = 0.29 just before the next outburst. The expansion of the disk begins at the very onset of an outburst.

512,755
PB85-147338 Not available NTIS
National Bureau of Standards (NEL), Boulder, CO.
Accretion in Cataclysmic Binaries. 4. Accretion Disks in Dwarf Novae.
Final rept.,
J. Smak. 1984, 29p
See also PB85-124360.
Pub. in Acta Astronomica 34, n2 p161-189 1984.

Time-dependent disk models are constructed, including the effects of thermal instability due to the ionization of hydrogen. The results are very sensitive to the assumptions concerning the viscosity. It is argued that by comparing models based on different viscosity prescriptions with the observational data for dwarf novae it should be possible to get an insight into the nature of viscosity. In the first approximation it is found that models based essentially on the alpha-disk approach with alpha approximately = 0.2, but with lower viscosity at low temperatures, reproduce reasonably well the dwarf novae behavior.

512,756
PB85-147965 Not available NTIS
National Bureau of Standards (NEL), Boulder, CO.
Better Determinations of Mass Loss Rates for Red Giants and Supergiants.
Final rept.,
S. A. Drake, and J. L. Linsky. 1984, 3p
Pub. in Proceedings of the Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun (3rd), Cambridge, MA., October 1983, p350-352, 1984.

Mass loss in the form of stellar winds is of great relevance to the study of stellar atmospheres, stellar structure and evolution, and the interstellar medium, and progress in these areas would greatly benefit from reliable estimates of mass loss rates (M dot) for many stars. Deutsch (1956) first showed that significant mass loss does occur for cool, luminous stars, but order of magnitude or more disagreements in the value of (M dot) between different studies of the same star are fairly typical. Goldberg (1979) and Zuckerman (1980) have reviewed the optical and infrared techniques by which the vast majority of (M dot) estimates have been obtained. In this paper, the authors discuss the 'new' methods which have become available in the last decade or so using other wavelength regions. The

authors limit this study to giants and super-giants of spectral type G to mid M, and thus do not mention (M dot) measurements in late M stars using molecular emission lines such as CO(J=2-1). They also exclude techniques that are only appropriate for binary systems of known orbital parameters.

512,757

PB85-147961 Not available NTIS
National Bureau of Standards (NEL), Boulder, CO.
Radio Observations of Active Stars: Direct Evidence for Polarity Reversals.
Final rept.,
D. M. Gibson. 1984, 5p
Pub. in Proceedings of the Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun (3rd), Cambridge, MA., October 1983, p197-201, 1984.

Radio astronomical measurements of source spectra and polarization can provide significant insight into the physical conditions in the emitting regions. Such observations of active stars can be particularly useful because they provide information on coronal conditions which is different from, but complementary to, that obtained by X-ray observations. Observations at other bands (UV, optical, IR) allow us to 'connect' the corona to the stellar surface and, in effect, provide additional boundary conditions for our interpretations. The author evaluated the homogeneous gyrosynchrotron model for stellar radio emission proposed by Owen et al. (1976) and found it difficult to reconcile with models for the coherent radio emission from the same stars. The author found the statistics of stellar radio polarization to be inconsistent with this model as well. Finally, the author suggests that a phenomenological model based on the 'leading-following spot' geometry seen in active regions on the Sun serves to explain most of the peculiarities observed in radio star spectra and polarizations and, in fact, provides an explanation for similar peculiarities seen in the rapidly varying coherent emission.

512,758

PB85-148136 Not available NTIS
National Bureau of Standards, Boulder, CO.
RS CVn Binary Systems.
Final rept.,
J. L. Linsky. 1984, 15p
Grant NGL-06-003-057
Pub. in Proceedings of Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun (3rd), Cambridge, MA., October 1983, p244-258 1984.

The author attempts to place in context the vast amount of data obtained in the last few years as a result of X-ray, ultraviolet, optical, and microwave observations of RS CVn and similar spectroscopic binary systems. As this topic is now very broad, the author concentrates on the RS CVn systems and their long-period analogs, and restricts the scope by attempting to answer on the basis of the recent data and theory the following questions: (1) Are the original defining characteristics still valid and still adequate. (2) What is the evidence for discrete active regions. (3) Have we derived any meaningful physical properties telling us about magnetic fields in RS CVn systems. (5) Is there evidence for systematic trends in RS CVn systems with spectral type.

4. ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

512,759

AD-A148 625/7/GAR PC A03/MF A01
Naval Research Lab., Washington, DC.
Description of the NRL(Naval Research Lab) Oblique-Incidence-Ionogram Data Base.
Memorandum rept.,
J. M. Goodman. 11 Dec 84, 27p Rept no. NRL-MR-5452

Since 1960 the Naval Research Lab. has been engaged in a number of field experiments during which sequences of oblique-incidence ionograms have been obtained. Data has been accumulated in both analog-photographic and digital form with the majority of the earlier data sets being of the former category. Approximately 50,000 ionograms have been archived for analysis purposes. This report outlines the texture of the data base indicating the mix of properties which may be employed to partition the data. Originator-supplied keywords include: Oblique-incidence sounding, HF, Frequency management, and Data base.

512,760

AD-A148 628/1/GAR PC A02/MF A01
Aerospace Corp., El Segundo, CA. Space Sciences Lab.
X Rays from the Aurora.
Technical rept.,
P. F. Mizera, and D. J. Gorney. 30 Sep 84, 21p TR-0084(4478-32)-3, SD-TR-84-40
Contract F04701-83-C-0084

Data from the x-ray instrument flown aboard the the polar orbiting DMSP-F2 satellite are used to calculate electron distributions as inputs to energy deposition, electron density, and ionospheric conductivity computer codes. The calculated electron distributions are compared with those measured by the J-package instrument also aboard the satellite. A dawn-to-dusk auroral crossing during January 31, 1978 is used to provide the data from which the ionospheric parameters are calculated. The agreement between the two data sets is excellent and suggests that bremsstrahlung x rays can be used to remotely monitor ionospheric perturbations. Originator-supplied keywords include: Auroral remote sensing, and Ionospheric density.

512,761

AD-A148 716/4/GAR PC A08/MF A01
California Univ., Riverside. Statewide Air Pollution Research Center.
Atmospheric Photochemical Modeling of Turbine Engine Fuels. Phase I. Experimental Studies. Volume 1. Results and Discussion.
Final rept. Jun 83-Jun 84,
W. P. L. Carter, A. M. Winer, R. Atkinson, M. C. Dodd, and W. D. Long. Sep 84, 161p AFESC/ESL-TR-84-32-VOL-1
Contract F08635-80-C-0359
See also Volume 2, AD-A147 786.

This report documents the results of the first phase of a two-part program aimed at developing for the U. S. Air Force experimentally tested computer models to predict worst-case potentials for air quality degradation resulting from use of current and potential future turbine engine (jet) fuels. The development and testing of such models requires an adequate data base derived from appropriate environmental chamber experiments and laboratory studies. In Phase I of this two-phase program, a total of 131 environmental chamber experiments were carried out in a approx. 6400-liter, all Teflon indoor environmental chamber and several kinetic measurements were made in order to obtain data required for model development. The chamber experiments included 47 single component-NOx-air irradiations of various representative fuel constituents and potential future fuel impurities, 15 fuel-NOx-air irradiations employing one whole and six synthetic surrogate fuels, and 69 control or characterization runs. This technical report is divided into two volumes. Volume I contains a detailed summary of the experimental results and a discussion of their significance. Volume II contains a tabulation of the environmental chamber data gathered during the course of the experimental phase of this program.

512,762

DE85000654/GAR PC A03/MF A01
Los Alamos National Lab., NM.
Substorms in the Earth's Magnetosphere.
D. N. Baker. 6 Aug 84, 40p LA-UR-84-3097, CONF-8408121-2
Contract W-7405-ENG-36
American Institute of Physics conference, Taos, NM, USA, 6 Aug 1984.
Portions are illegible in microfiche products.

Magnetospheres are plasma regions of large scale in space dominated by magnetic field effects. The earth, and many planets in our solar system, are known to have magnetospheric regions around them. Magnetospheric substorms represent the intense, rapid dissipation of energy that has been extracted from the solar wind and stored temporarily in the terrestrial magnetotail. In this paper a widely, but not universally, accepted model of substorms is described. The energy budgets, time scales, and conversion efficiencies for substorms are presented. The primary forms of substorm energy dissipation are given along with the average levels of the dissipation. Aspects of particle acceleration and precipitation, Joule heating mechanisms, ring current formation, and plasmoid escape are illustrated based on in situ observations taken from the large available data base. A brief description is given of possible analogues of substorm-like behavior in other astrophysical systems. 27 references, 12 figures. (ERA citation 10:003592)

512,763

DE85002352/GAR PC A03/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Non-Precipitating Cumulus Cloud Study.
A. J. Alkezweeny. Oct 84, 30p PNL-5283
Contract AC06-76RL01830
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This document describes the field experiment that was conducted in Kentucky during the period from July 20 to August 24, 1983. The objectives were to determine the vertical transport of acidic pollutants by cumulus convection and formation of acidic substances in non-precipitating clouds. The study is a research component of Task Group C (Atmospheric Processes) of the National Acid Precipitation Assessment Program. To examine the vertical transport, an SF sub 6 tracer was released from one aircraft, sampled by another aircraft, and sampled on the ground. The results show that pollutants from the boundary layer are lifted to the cloud layer. From there, they are intermittently transported both to the ground and to higher elevations, possibly in the vertical updrafts of towering cumulus clouds. A series of instrumented aircraft flights around the clouds were conducted to study the formation of acidic aerosols. The concentrations of SO sub 2 , SO sub 4 , NO sub 3 , NH sub 4 , NH sub 3 , HNO sub 3 and trace metals were measured by filter techniques. Furthermore, NO/sub x/, O sub 3 , light scattering, and basic meteorological parameters were measured in real-time. Detailed chemical composition of aerosols and NH sub 3 was also measured on the ground. Preliminary results show that the molar ratio of SO sub 2 / SO sub 2 + SO sub 4) at cloud tops is higher than at cloud bases. This indicates that sulfate aerosols were formed in the clouds. The NH sub 3 concentration shows higher values at nighttime than daytime and decreases sharply with increasing altitude. 3 references. (ERA citation 10:003285)

512,764

DE85002413/GAR PC A02/MF A01
Los Alamos National Lab., NM.
Effects of the Solar-Terrestrial Environment on Satellite Operations.
D. N. Baker. 1984, 18p LA-UR-84-3325, CONF-8406220-1
Contract W-7405-ENG-36
Solar-terrestrial prediction workshop, Meudon, France, 18 Jun 1984.
Portions are illegible in microfiche products.

Hot plasma and energetic particle populations in space are known to produce spacecraft operational anomalies. In the inner part of the earth's magnetosphere, these effects are primarily due to durably trapped radiation belt particles, and the integrated doses can be calculated quite accurately for any given orbit. In the outer magnetosphere many spacecraft operational problems appear to be due to intense, transient phenomena. It is shown that three types of naturally-occurring, and highly variable, hostile particle radiation environments are encountered at, or near, the geostationary orbit: (1) high-energy protons due to solar flares; (2) very high energy electrons (2-10 MeV) of unknown origin; and (3) energetic ions and electrons produced by magnetospheric substorms. Present particle sensor systems provide energetic particle detection and assessment capabilities during these kinds of high-energy radiation events. Numerous operational anomalies and subsystem problems have occurred during each type of event period and the association of

such upsets is demonstrated in this paper. Methods of prediction of magnetospheric disturbances are discussed, and overall recommendations are made for dealing with this continuing problem. (ERA citation 10:003551)

512,765
N85-12072/3/GAR PC **A04/MF A01**
Royal Norwegian Council for Scientific and Industrial Research, Oslo. Space Activity Div.
Space Research in Norway.
Annual Report, 1983.
A. Gundersen, and A. L. R. Holtet. 1984, 55p SAD-110-T, ISBN-82-7224-066-1
Presented at Cospar Meeting, Graz, 2-7 Jul. 1984.

Norwegian space physics, astrophysics and space-related life science research is summarized. A rocket range, telemetry station, EISCAT facility, ionospheric heating facility, the Partial Reflections Experiment D-region radio wave study, and the Scandinavian Twin Auroral Radar Experiment are described. Participation in ESA programs is indicated.

512,766
N85-12073/1/GAR PC **A04/MF A01**
Swedish Board for Space Activities, Solna.
Space Research in Sweden.
Annual Report, 1982-1983.
K. Fredga. 1984, 59p
Presented at Cospar Meeting, Graz, 2-7 Jul. 1984.

Swedish research in magnetospheric and ionospheric physics; upper atmosphere; astrophysics; material sciences; and remote sensing is summarized. Measurements of charged particles and electric and magnetic fields using satellites, sounding rockets, and balloons; study of atmospheric processes and composition at high latitudes using sounding rockets; studies of solar and stellar UV radiation, and IR studies using satellite sounding rockets and balloons; solidification processes of metals in zero-g and diffusion processes in liquid metals using sounding rockets; and microwave radiometry, spectral signatures and image analysis using satellite images and airborne or landbased sensors are described.

512,767
N85-12513/6/GAR PC **A03/MF A01**
Consiglio Nazionale delle Ricerche, Frascati (Italy). Ist. di Fisica dello Spazio Interplanetario.
Cold Streams of Ionospheric Oxygen in the Plasma Sheet During the CDAW-6 Event of March 22, 1979.
S. Orsini, E. Amata, M. Candidi, H. Balsiger, and M. Stokholm. Dec 83, 30p NAS 1.26:174064, IFSI-83-16, NASA-CR-174064
Contracts NAS5-26257, NAS5-25530
Submitted for Publication Sponsored by Swiss National Foundation and Esa.

During magnetospheric substorm events, the plasma and ion composition experiments in the ISEE-1 and 2 satellites detected cold ionospheric O+ streams, moving tailwards in the near Earth magnetotail. Flow is parallel to the magnetic field lines, with drift velocity in agreement with the electric field topology obtained by mapping the model ionospheric field along the magnetic field lines. Fluctuations of the flow velocity of the streams can be related to magnetotail movements. Oscillations of the flow direction and speed with periods ranging from 5 to 10 min that suggest the presence of waves are observed. The streams are observed at all distances between 15 and 6 Re from the Earth. When averaged over 360 deg, the streams show up as a low energy peak, superimposed on the distribution of isotropic plasma sheet ions. This double-peak structure of the energy spectrum seems typical of the disturbed plasma sheet.

512,768
N85-12514/4/GAR PC **A03/MF A01**
Danish Space Research Inst., Lyngby.
Occurrences of the Polar Slant E Condition (SEC) at Narssarssuaq, Godhavn, Thule 1982.
I. S. Primdahl. 1984, 47p

Monthly data sheets of quarter of half hourly polar slant E occurrences at Narssarssuaq, Godhavn and Thule in 1982 are given.

512,769
PB85-138196/GAR PC **A03/MF A01**
Brookhaven National Lab., Upton, NY.
Evaluation of Two Numerical Integrator Schemes.
Final rept.,
A. A. N. Patrinos, and M. J. Leach. Dec 84, 43p EPA/600/3-84/112

Two numerical integrators of the advection-diffusion equation used in air pollution simulations were tested in the framework of an evaluation methodology. The schemes were an integrator based on a polynomial approximation algorithm and a version of the pseudospectral integrator. The evaluation methodology included two test cases: the transport of a spline puff and a constant point source. Testing criteria included accuracy, conservation, and efficiency. Accuracy was assessed with the use of 'norms' which used the exact analytical solution values. The 'polynomial' integrator demonstrated superior consistency in its performance and generally better accuracy. The cost was, however, about 2.5 times that of the pseudospectral one. The pseudospectral integrator with its expanding mesh displayed deteriorating accuracy whenever the signal approached the boundaries. Simple filtering algorithms have failed to effectively control this problem.

512,770
PB85-138741/GAR PC **E03/MF E03**
Science and Engineering Research Council, Chilton (England). Rutherford Appleton Lab.
Measurements of the Angular Distribution of Precipitating Electrons in a Breakup Aurora,
C. P. Chaloner, D. A. Bryant, and D. S. Hall. c1984, 9p RAL-84-070

Measurements of the complete pitch-angle distribution of precipitating auroral electrons in the energy range 0.5 to 25 keV in several arcs are presented. The measurements were made with a time resolution of 2s between altitudes of 400 and 700 km by electrostatic analyzers carried on a sounding rocket. The angular structure and temporal development of suprathermal burst events are discussed, together with constraints on the responsible mechanism, and a possible mechanism is suggested. (Copyright (c) Science and Engineering Research Council 1984.)

512,771
PB85-138758/GAR PC **E03/MF E03**
Science and Engineering Research Council, Chilton (England). Rutherford Appleton Lab.
Electron Acceleration by Lower Hybrid Waves on Auroral Field Lines,
D. S. Hall, D. A. Bryant, and R. Bingham. c1984, 8p RAL-84-069

Particle measurements show that electron acceleration on auroral field lines is a statistical, velocity-dependent, process. It is proposed that the process is stochastic acceleration by waves, and demonstrated that lower hybrid waves seen on auroral field lines have the right properties to account for the electron acceleration. It is further shown that the lower hybrid wave power measured on auroral field lines can be generated by the streaming ions observed at the boundary of the plasma sheet, and that this wave power is sufficient to account for the electron power observed close to the atmosphere. (Copyright (c) Science and Engineering Research Council 1984.)

512,772
PB85-138907/GAR PC **E05/MF E01**
Eidgenoessische Technische Hochschule, Zurich (Switzerland).
Spectral Thermal Infrared Emission of the Terrestrial Atmosphere,
G. Finger, and F. K. Kneubuehl. 1984, 92p

After a short discussion of the infrared properties of the atmosphere, their scientific and technical implications, relevant theories and previous experiments, the authors present their own studies on the spectral thermal emission of the atmosphere in the two infrared windows at 8 micrometers to 14 micrometers and at 3 micrometers to 5 micrometers. The spectral thermal infrared emission of the atmosphere incident from zenith was measured as a function of height from the ground to the top of the troposphere at 8500 m above sea level. For this purpose radiometers were installed upward looking in a Pilatus-Porter aircraft. Simultaneous radionsonde flights recorded all relevant meteorological parameters including the height profile of ozone concentration. This allowed the authors to compare measurements of atmospheric thermal emission with LOWTRAN calculations based on in-situ radiosonde data. This comparison confirms that existing band models can predict absorption and emission of the atmosphere with sufficient accuracy in the spectral region of well known H2O, CO2, O3 absorption bands. Both the line-shape and the aggregate interpretation of the continuum absorption are discussed with respect to the authors' experimental results.

512,773
PB85-145423 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Measurements of Sky Luminance, Sky Illuminance, and Horizontal Solar Radiation.
Final rept.,
S. Treado, and G. Gillette. 1983, 6p
Pub. in Jnl. of the Illuminating Engineering Society 12, n3 p130-135 Apr 83.

Initial findings are presented of a sky measurement program currently underway at the National Bureau of Standards. Correlations are discussed relating horizontal illuminance to horizontal solar radiation, and zenith luminance to solar altitude angles for a North American climate (Washington, D.C.). These are simplified empirical equations to a complex phenomenon, but should be acceptable for most practical daylighting applications where accuracy is needed only within + or - 15%. Measurements were made only in the Washington, D.C. area. Similar efforts need to be made for other North American localities to validate these relationships.

512,774
PB85-145563 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
High Precision Atmospheric Ozone Measurements Using Wavelengths between 290 and 305 nm.
Final rept.,
H. J. Kostkowski, R. D. Saunders, A. E. S. Green, J. F. Ward, and C. H. Popenoe. 30 Jun 84, 12p
Pub. in Jnl. of Geophysical Research 89, nD4 p5215-5226, 30 Jun 84.

It is shown theoretically that many errors are significantly less when determining atmospheric ozone thicknesses from measurements of solar terrestrial spectral irradiance in the wavelength region between 290 and 305 nm as compared to the 305- to 340-nm region employed by the Dobson spectrophotometer. In order to test this conclusion experimentally, an elaborate set of state-of-the-art measurements have been made in the shorter wavelength region in Gainesville, Florida, between June 13 and June 18, 1960. Details of these measurements, including an extensive error analysis, are presented and indicate that such short-wavelength measurements, particularly between 295 and 305 nm, can be used to detect long-term changes of atmospheric ozone with an uncertainty not exceeding 1%. Observing conditions restricted the Gainesville measurements to zenith angles of less than 35 degrees. Further investigations are required to determine the shortest wavelength that can be used at significantly greater zenith angles.

4B. Meteorology

512,775
DE85000187/GAR PC **A03/MF A01**
Lawrence Livermore National Lab., CA.
Energy and Technology Review, September 1984.
L. Cox, J. Frank, R. A. Condouris, R. B. Crawford, and L. de Vore. Sep 84, 42p UCRL-52000-84-9
Contract W-7405-ENG-48
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Items have been entered individually into the data base. Articles include: climatic warming and carbon dioxide; response of plants to increased carbon dioxide; and simulating nuclear cratering events at the Pacific proving ground. (ERA citation 10:003290)

512,776
N85-12501/1/GAR PC **A04/MF A01**
Commonwealth Scientific and Industrial Research Organization, Aspendale (Australia).

Report of the Division of Atmospheric Physics, 1980-1983.
1984, 65p

The objectives of the dynamics research program are: (1) the increase of understanding of the dynamics and physics of the atmosphere and, to a lesser extent, the ocean; and (2) the use of this knowledge to develop procedures and models to improve short and long-term weather forecasting and prediction of other socially and economically significant environmental variables, such as the concentration of atmospheric pollutants and the large scale atmospheric transport of chemical constituents. Descriptions are divided, rather arbitrarily, into three areas - large scale dynamics which embodies geostrophic flow, smale scale dynamics which involves sub-geostrophic flow, and geophysical fluid dynamics involving primarily laboratory-tank experiments.

512,777
N85-12522/7/GAR PC **A10/MF A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
GASP Cloud- and Particle-Encounter Statistics and Their Application to LFC Aircraft Studies. Volume 2: Appendixes.
W. H. Jasperson, G. D. Nastrom, R. E. Davis, and J. D. Holdeman. Oct 84, 212p NAS 1.15:85835-V-2, L-15789-V-2, NASA-TM-85835-V-2

Summary studies are presented for the entire cloud observation archive from the NASA Global Atmospheric Sampling Program (GASP). Studies are also presented for GASP particle-concentration data gathered concurrently with the cloud observations. Cloud encounters are shown on about 15 percent of the data samples overall, but the probability of cloud encounter is shown to vary significantly with altitude, latitude, and distance from the tropopause. Several meteorological circulation features are apparent in the latitudinal distribution of cloud cover, and the cloud-encounter statistics are shown to be consistent with the classical mid-latitude cyclone model. Observations of clouds spaced more closely than 90 minutes are shown to be statistically dependent. The statistics for cloud and particle encounter are utilized to estimate the frequency of cloud encounter on long-range airline routes, and to assess the probability and extent of laminar flow loss due to cloud or particle encounter by aircraft utilizing laminar flow control (LFC). It is shown that the probability of extended cloud encounter is too low, of itself, to make LFC impractical. This report is presented in two volumes. Volume I contains the narrative, analysis, and conclusions. Volume II contains five supporting appendixes.

512,778
N85-12523/5/GAR PC **A04/MF A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Recent Examples of Mesoscale Numerical Forecasts of Severe Weather Events Along the East Coast.
P. J. Kocin, L. W. Uccellini, J. W. Zack, and M. L. Kaplan. Nov 84, 66p NAS 1.15:86172, NASA-TM-86172

Mesoscale numerical forecasts utilizing the Mesoscale Atmospheric Simulation System (MASS) are documented for two East Coast severe weather events. The two events are the thunderstorm and heavy snow bursts in the Washington, D.C. - Baltimore, MD region on 8 March 1984 and the devastating tornado outbreak across North and South Carolina on 28 March 1984. The forecasts are presented to demonstrate the ability of the model to simulate dynamical interactions and diabatic processes and to note some of the problems encountered when using mesoscale models for day-to-day forecasting.

512,779
N85-12531/8/GAR PC **A04/MF A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Oberpfaffenhofen (Germany, F.R.).
Operational Test of Three Instruments for Measuring Liquid Water Content in Laboratory and from Aircraft.
H. Loebel. May 84, 67p DFVLR-MITT-84-06
In German; English Summary.

Three instruments for quantitative determination of liquid water content of clouds are described. Laboratory and flight measurements were carried out. Differemt methods for measuring and compensating are described, and the results of measurements during a campaign in winter are compared.

512,780
PB85-135002/GAR PC **A02/MF A01**
National Weather Service, Garden City, NY. Eastern Region.
TRAJ - Single Station Trajectory Plot,
T. Niziol. Dec 84, 22p NOAA-NWS-ERCP-27

This program generates an AFOS plot of the NMC Three Dimensional Trajectory forecast for a single station. The Three Dimensional Trajectory Model (Technical Procedures Bulletin No. 25) was developed to attain greater accuracy in the prognosis of temperature and moisture distribution below 700mb. Prior to AFOS, the forecaster routinely plotted up the information manually from the trajectory bulletin. With the advent of AFOS, it is possible to plot the data automatically. More important, however, is the ability to overlay the Trajectory graphic onto other compatible AFOS graphics. The trajectory forecast becomes a more valuable product because it can be used interactively with other NMC products that are stored as AFOS graphics.

512,781
PB85-137578/GAR PC **A03/MF A01**
National Weather Service, Silver Spring, MD. Techniques Development Lab.
AFOS (Automation of Field Operations and Services)-ERA Forecast Verification, September 1984,
R. L. Miller, M. M. Heffernan, and D. P. Ruth. Sep 84, 50p NOAA/NWS/TDL/CP-84/3
See also PB84-129303.

The National Weather Service (NWS) has implemented a national forecast verification system which utilizes the processing and communication capabilities of the Automation of Field Operations and Services (AFOS) system. This AFOS-era forecast verification (AEV) system is a major step in implementing the National Verification Plan and replaces two existing national verification programs. Local and guidance forecasts of public and aviation elements are verified for two forecast cycles per day. The AEV system is designed to collect and collate forecasts and observations; to provide a local, quality controlled database; to transmit data to a central site; to provide a permanent central archive; and to produce local, regional, and national summaries.

512,782
PB85-137586/GAR PC **A03/MF A01**
National Weather Service, Silver Spring, MD. Techniques Development Lab.
AFOS (Automation of Field Operations and Service) Surface Observation Decoding,
H. P. Perrotti. Sep 84, 40p NOAA-NWS-TDL-CP-84-2

A significant amount of the communications traffic transmitted over the Automation of Field Operations and Service (AFOS) network is surface observations. These observations are used by forecasters for visual analysis and as input to locally run FORmula TRANslation (FORTRAN) computer programs. Before the data can be used by these programs for mathematical computations, they must be converted from American National Standard Code for Information Interchange (ASCII) to numerical form. Applications programs capable of running in the background partition of the AFOS hardware have been written to standardize the conversion of these data. These programs can be run locally as stand alone tasks or their subroutines can be incorporated into other computer programs. One of the primary uses of surface observations at local AFOS sites is to display them on specified map backgrounds for synoptic analysis. Many sites create synoptic displays each hour during inclement weather. To create these displays, four programs are included in the standard package generally referred to as the 'SAO Decoder' (Thomas, 1981).

5.
BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

512,783
AD-A148 652/1/GAR PC **A04/MF A01**
Logistics Mangement Inst., Bethesda, MD.
How Winners Win: Lessons Learned from Contract Competition in Base Operations Support.
Final rept.,
J. B. Handy, and D. J. O'Connor. Sep 84, 75p Rept no. LMI-ML323
Contract MDA903-81-C-0166

Competition in Base Operations Support (BOS) produces savings for DoD. In the face of competition, costs drop by an average of 27% whether a contractor or the in-house work force wins. If we knew how winners realized those savings, they might be duplicated by in-house Government activities even when competition isn't possible. Winners of competed BOS functions follow many common approaches to increase their productivity. These approaches include: organizational changes, simplifying organizations to reduce the number of supervisors; consolidation of working locations to eliminate the expense of supervising dispersed activities; use of working supervisors who not only direct and schedule workers but also perform direct labor themselves; use of multiskilled workers to reduce periodic backlogs with a smaller work force; use of lower-skilled workers; reserving higher skilled employees for jobs that suit their talents; provision of equipment, vehicles, and communications to maximize worker productivity; establishment of worker goals and accountability to motivate employees; provision of computer support to complete work more quickly and accurately; and elimination of unnecessary work, abolishing or modifying nonessential tasks.

512,784
AD-A148 702/4/GAR PC **A05/MF A01**
Naval Postgraduate School, Monterey, CA.
Financial Planning and Control for the Military Officer.
Master's thesis,
F. R. Hahndorf, and J. J. Riggio. Jun 84, 85p Rept no. NPS-54-84-020

The purpose of this thesis is to provide the military officer with a single reference in personal financial planning and control. Pay, benefits, taxes, inflation, budgets, alternatives and various ideas to help the officer become more aware of the power of financial planning and control are discussed. It focuses on the need for the officer to take control and responsibility for his personal finances. It provides a step by-step guide for formulating a financial plan. The end objective is to provide the Navy and Marine Corps with more efficient and productive officers through improved confidence and awareness of money management. This additional knowledge will enable the officer to better assist his personnel in the financial matters.

512,785
AD-A148 713/1/GAR PC **A04/MF A01**
Office of Naval Research, London (England).
European Scientific Notes, Volume 38, Number 12.
Monthly publication,
L. E. Shaffer. Dec 84, 54p Rept no. ESN-38-12
See also Volume 38, Number 11, AD-A148 228.

European Scientific Notes (ESN) is a monthly publication with brief articles on recent developments in European scientific research. The publication is not intended to be part of the scientific literature. The value of

ESN articles to Americans is to call attention to current developments in European science and technology and to the institutions and people responsible for these efforts. ESN authors are primarily ONRL staff members. Occasionally articles are prepared by or in cooperation with staff members of the USAF European Office of Aerospace Research and Development or the US Army Research and Standardization Group. Qualified US scientists travelling in Europe may also be invited to author an ESN article. (Author).

512,786
AD-A148 768/5/GAR PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Federal Land Management Decisions Related to Executive Order 12348.
Master's thesis,
N. D. McAnally. Jun 84, 83p

This thesis identifies issues surrounding Federal Land Management decisions which relate to Executive Order (E.O.) 12348. It provides a history of the Federal Land Management Program, discussing related executive actions preceding E.O. 12348. The incentives and objectives affecting individual decision makers are examined to determine effects on land management actions. Public perceptions which influence incentives of individual decision makers are revealed within the thesis. Results of E.O. 12348 are analyzed to determine the necessity of providing appropriate incentives to decision makers involved in future land management actions. (Author).

512,787
DE85000978/GAR PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Requirements Formulation Subtask 1.A of the Major Item System Mapping (MISM) Project.
P. Y. Bengtson, P. A. Clark, G. R. Hadder, M. M. Stevens, and B. Thomas. 1984, 88p DOE/OR/21400-T45
Contract AC05-84OR21400
Portions are illegible in microfiche products.

The following tasks are necessary for the completion of Subtask 1A of the MISM project: (1) development of specific descriptions of functional capabilities; (2) review of user requirements and objectives; (3) cataloging of requirements for standard and special reports and what if reports; (4) definition and classification of information systems for MICOM, TSARCOM, TACOM, CECOM, AMCCOM, Medical, Security, development commands, and project monitors; (5) definition of the scope and the level of detail for the MISM proces to include BOIP production requirements; (6) identification of source files and system and organization interfaces for establishment of the MISM data base (DB); (7) definition of the data interchange requirements; (8) definition of the communications requirements; (9) definition of standard retrieval requirements; (10) definition of applications for standard and special reports and for potential what if questions; and (11) definition of standard graphics capabilities. (ERA citation 10:004121)

512,788
DE85002243/GAR PC **A12**/MF **A01**
Argonne National Lab., IL.
Plan for Administrative Computing at ANL (Argonne National Laboratory) FY1985-FY1987.
M. Bretscher, D. O'Brien Hale, R. Hischier, N. Moore, and F. Moszur. Aug 84, 265p ANL/TM-420
Contract W-31-109-ENG-38

The plan for FY1985 through FY1987 represents the first step in addressing strategic planning for the information critical to the business functions of the Laboratory, for the operating environment within which administrative systems function, and for the infrastructure that aids Laboratory management and staff to access and use administrative data effectively. This document encompasses business and office systems, the management of administrative computing, and the funding of activities related to administrative computing. The primary purposes of the plan are to insure identification of all the necessary components of administrative computing, to provide a guideline for administrative computing in the coming years, and to obtain concurrence from Laboratory management on a long-term information plan that enhances the way the Laboratory performs its business functions. (ERA citation 10:001681)

512,789
ED-246 914 Not available NTIS
International Council on Archives, Paris (France).
Preservation and Administration of Private Archives: A RAMP Study,
R. E. Seton. 1984, 73p PGI-84/WS/6
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This study is intended to make more widely known and understood the basic problems involved in ensuring preservation and access to an invaluable informational and cultural resource--the archives of non-governmental institutions and organizations. It is based on a survey of the current situation in 28 selected Unesco member states regarding the acquisition, preservation, arrangement, description, and access to the principal categories of private archives, including those of business and labor organizations, cultural and scientific institutions, estates, and families. Of the 65 questionnaires mailed to institutions, records offices, libraries, and museums thought to have holdings of private archives and manuscripts, 39 were returned. The findings of the survey are analyzed to determine trends, needs, and problems, with special reference to the needs of developing countries. The study concludes with recommendations for action at the national, regional, and international levels to assist in ensuring more comprehensive and effective preservation and administration of private archives. Appended are the questionnaire form and an annotated bibliography of writings used and consulted in the preparation of the study. (DMC).

512,790
N85-12202/6/GAR PC **A03**/MF **A01**
Cambridge Univ. (England).
Activities Report of the Department of Engineering.
Annual Report, 1982/83.
1983, 34p

Acoustics, aerodynamics, fluid mechanics, design, electrical, materials science, mechanical, control, robotics, soil mechanics, structural engineering, thermodynamics, and turbomachine engineering research are described.

512,791
N85-12411/3/GAR PC**$12.00**
National Aeronautics and Space Administration, Washington, DC.
Earth Resources, a Continuing Bibliography with Indexes.
Oct 84, 136p NAS 1.21:7041(43), NASA-SP-7041(43)

This bibliography lists 460 reports, articles and other documents introduced into the NASA scientific and technical information system between July 1 and September 30, 1984. Emphasis is placed on the use of remote sensing and geophysical instrumentation in spacecraft and aircraft to survey and inventory natural resources and urban areas. Subject matter is grouped according to agriculture and forestry, environmental changes and cultural resources, geodesy and cartography, geology and mineral resources, hydrology and water management, data processing and distribution systems, instrumentation and sensors, and economical analysis.

512,792
PB85-133718/GAR PC **A05**/MF **A01**
Indiana Univ. at Bloomington.
Cost-Benefit Analysis and Project Design. Workbook: Quantitative Procedures and Applications (Revised August 1981),
J. D. Donahue, and J. Simon. 1981, 80p AID-PN-AAL-627

Cost-benefit analysis, as a tool for project design and appraisal, brings together economic principles, empirical data, and quantitative techniques to produce organized, clear, and easily understood estimates of a project's value. This workbook gives instruction on quantitative procedures, the mechanics of cost-benefit analysis. The first part introduces the procedures needed to perform a cost-benefit analysis. Each procedure is covered in a short section that gives the purpose, the data requirements, and the results. The necessary formulas and abbreviations are explained and illustrated. Special worksheets that speed and simplify the procedures are introduced, and step-by-step instructions are provided. A fictional example - a tractor project - is then given. The second part of the workbook is a case study of a irrigation project. Technical, financial, and economic descriptions drawn from an actual project are given so that the user may perform the cost-benefit analysis. The authors caution that the workbook does not present a special methodology nor does it address the non-technical dimensions of cost-benefit analysis. Finally, an appendix gives the discount and annuity factors needed to complete the case study analysis, and also provides answers to the exercise.

512,793
PB85-135853/GAR PC **E04**/MF **E01**
Ontario Ministry of Municipal Affairs and Housing, Toronto.
Highrise Building Performance Study Repair Records,
A. Zdanowicz, K. McCann, S. Chong, and S. Salenieks. Apr 84, 63p ISBN-0-7743-9881-7
Prepared in cooperation with Metropolitan Toronto Housing Authority (Ontario).

A portion of a highrise apartment building's total operating cost is attributed to maintenance. This portion of operating costs consumed by maintenance increases as a building ages. In order to reduce maintenance costs it is necessary to identify problem areas and determine methods of dealing with them. Financial records indicate areas in which maintenance dollars are spent but they don't provide sufficient information for detailed scrutiny. More information is necessary on the type, source and method of repairs. With this in mind a detailed study of the maintenance operations of a sample group of highrise buildings was warranted. This could only be achieved by doing a physical compilation of the work records in a reasonable number of highrise buildings.

512,794
PB85-138501/GAR PC**$20.00**
Okochi Memorial Foundation, Tokyo (Japan).
Research and Development in Japan Awarded the Okochi Memorial Prize, 1984.
c1984, 107p
See also PB84-154087. Sponsored by Japan Shipbuilding Industry Foundation.

The report describes the scientific research developed in Japan during 1984, and the prizes awarded to the candidates and different companies by the foundation.

512,795
PB85-150829/GAR PC **A04**/MF **A01**
Office of Management and Budget, Washington, DC. Office of Information and Regulatory Affairs.
Automatic Data Processing and Telecommunications in the Federal Government: An Annotated Bibliography of Laws, Policies, Regulations, and Associated Documents.
Final rept.
Jan 85, 62p

This document is an annotated bibliography of laws, policies, and regulations, as well as associated documents, concerning automatic data processing (ADP) and telecommunications in the Federal Government. Legislative branch documents are briefly referenced. Within the executive branch, the bibliography includes documents from central agencies such as Office of Management and Budget and General Services Administration. It also includes standards documents such as Federal Information Processing Standards and Federal Telecommunications Standards. Briefer coverage of commercially published materials is provided.

5B. Documentation and Information Technology

512,796
AD-A148 714/9/GAR PC **A09**/MF **A01**
Assistant Secretary of Defense (Public Affairs), Washington, DC.
Catalog of Audiovisual Productions. Volume 4. DoD(Department of Defense) Productions Cleared for Public Release.
Jun 84, 178p

Partial contents: Ordering Instructions--Where and How to Obtain Copies and Conditions of Loan; Alpha-

betical Title Index/SAVPIN Cross Reference; and Catalog.

512,797

AD-A148 838/6/GAR PC A03/MF A01
Navy Personnel Research and Development Center, San Diego, CA.
Bibliography of Unclassified Reports: FY 1984.
Technical rept. Oct 83-Sep 84.
Nov 84, 41p Rept no. NPRDC-TR-85-8

This report lists all unclassified technical reports, special reports, and technical notes that have been published by the Center in FY 1984. Manpower and Personnel Laboratory technical notes and Training Laboratory reports published in FY 1984 are also listed. Publications in each category are listed in chronological order under six areas: manpower management, personnel administration, organization management, education and training, human performance, and bibliographies, reviews, and summaries. (Author).

512,798

ED-246 846 Not available NTIS
International Information Centre for Terminology, Vienna (Austria).
International Bibliography of Computer-Assisted Terminology.
M. Krommer-Benz. 1984, 41p PGI-84/WS/12
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Because of the need for adequate reference tools in the new area of data banks for the field of terminology (there are currently 25 term banks in existence and more are planned), this bibliography lists some 350 references selected from a large number of both primary and secondary sources. It includes some entries selected from a list of publications on terminological word banks, which was published as part of Infoterm Newsletter 1. Emphasis is on articles, books, and proceedings of conferences on terminological data banks and computerized terminography published during the last decade. Entries are alphabetically arranged by author, and English translations of titles are included for all source languages other than French. Languages include Danish, German, Japanese, Russian and Swedish; Japanese and Russian titles have been transliterated into Roman characters. (LMM).

512,799

ED-246 859 Not available NTIS
Using an Audio Cassette and Workbook for Group Training.
D. W. Gordon. 2 Nov 82, 8p
Paper presented at the Online '82 Conference (Atlanta, GA, November 2, 1982).
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

A self-instructional audiocassette/workbook training kit, Learn INFORM, was designed to teach new users how to search the database ABI/INFORM and to help more experienced searchers sharpen their searching skills. The 35-minute audiocassette is a dialogue between an information specialist and an end user, while the step-by-step workbook includes exercises, search samples, and a guide to using ABI/INFORM on each system where the file is available. Group sessions were implemented with six online user groups to assess its effectiveness in a group setting; a designated leader operated the tape player and served as a moderator for each group. An ABI/INFORM training survey was sent to 60 attendees in four of the six groups. Of the 46 (77%) respondents, 85% had at least 6-months search experience, although 57% rarely searched ABI/INFORM. The audiocassette and workbook were generally viewed favorably, and overall responses to the session were positive. Weaknesses identified concerned the difficulty of matching the level of instruction to searcher experience and the dramatic approach used in the audiotapes, which some respondents considered to be either unrealistic or unflattering to librarians. The training survey form is included. (Author/LMM).

512,800

ED-246 900 Not available NTIS
Pennsylvania State Library, Harrisburg.
Comprehensive Plan for Library Service in Pennsylvania. Recommendations for Improved Access to Library Resources in Pennsylvania.
1983, 92p
Photographs may not reproduce clearly.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This report of the 95-member Council for the Comprehensive Plan for Libraries, which included representatives from government, libraries, and the public sector, is not intended to answer all the questions for all those concerned about the future of libraries, but rather to bring focus to the issues and to set a direction for solving the problems libraries are facing. It is comprehensive because it attempts to look at a variety of concerns facing all types of library resources in Pennsylvania. The goal of the study, which was undertaken in October 1981, was to review the major issues of resources, technology, and access which affect the users of libraries. In February 1983, the State Library sent out 4,308 questionnaires--of which 32% were returned--to sample members of various organizations and interest groups represented on the Planning Council to ascertain their reactions to the proposed courses of action. After choosing the most important and politically feasible courses of action, the Planning Council reached consensus on the 19 recommendations that became the basis of this plan. This report divides the final recommendations into three broad areas: quality of service, materials and resources, and management practices. Eight appendices provide further details about the study and the library survey form. (DMC).

512,801

ED-246 901 Not available NTIS
State of the Art and Future of Online Services,
L. Trubkin. 10 Nov 82, 14p
Paper presented at the Pre-Conference Workshop of the Southeastern Library Association/Kentucky Library Association Meeting (Louisville, KY, 10 November 1982).
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Use of online information services is currently widespread in public, academic, government, and corporate libraries and information centers. The trend is for smaller libraries of all varieties to install terminals and obtain passwords, while larger libraries add systems of all types. Even in the face of a severe recession, online growth rates have held up well. In the long term, however, the online industry faces serious challenges--economic, technological, and sociological--which it may not be prepared to meet. Online services firms need thoughtful new strategies to deal with user desires for downloading, local control, and simple-to-use systems and protocols. Such strategies need to be based more upon market needs and less upon technological capabilities. Database publishers also need to arrive at an appropriate price per record which is fair compensation for later reuse within organizations, and to begin experimenting with new forms of document delivery. Online users can help themselves and the information industry by enhancing their organization's information resources, becoming activist consumers of online services, and expanding their horizons to include not only bibliographic databases but the numeric services. (DMC).

512,802

ED-246 905 Not available NTIS
Library of Congress, Washington, DC. Network Development Office.
Public/Private Sector Interactions: The Implications for Networking. A Discussion Report Prepared by the Network Advisory Committee.
1983, 53p ISBN-0-8444-0438-1
Proceedings of a Program Meeting held October 25-27, 1982. For related document, see ED 215 678.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

At a 2-day meeting in October 1982, the Library of Congress Network Advisory Committee (NAC) members discussed the complex issues involved in public and private sector interactions and their relationship to networking activities. The report, 'Public Sector/Private Sector Interaction in Providing Information Services,' prepared by the National Commission on Libraries and Information Science (NCLIS), Public Sector/Private Sector Task Force, was used as a core document. In addition, NAC commissioned a concept paper by Glyn Evans, Executive Director, SUNY/OCLC. Discussion groups were formed to explore how the principles and recommendations of the report to NCLIS related to special services provided by either a public or private sector agency. The groups concluded that while equity of access and preservation were of concern, these services could, with appropriate safeguards, be supplied by either sector. In addition to the report of the meeting, this document includes a list of the NAC members, an executive summary, and four appendices: (1) a background reading list; (2) a review and summary of the NCLIS task force report by Robert M. Hayes of the University of California, Los Angeles; (3) Glyn Evans' discussion paper; and (4) an outline of NAC actions on the NCLIS task force report. (DMC).

512,803

ED-246 906 Not available NTIS
United Nations Educational, Scientific and Cultural Organization, Paris (France). General Information Programme.
Archival Services and the Concept of the User: A RAMP Study.
H. A. Taylor. 1984, 108p PGI-84/WS/5
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Prepared under contract with the International Council on Archives (ICA), this study is intended to assist archivists and information specialists in creating, developing, and evaluating modern archival systems and services, particularly with reference to the concept and the role of the user in such systems and services. It ranges over a wide field in an attempt to place archival services and the user within the context of available communication techniques and analogous developments for library science. The archival profession is in need of its own user studies and it is hoped that this preliminary survey of themes in the literature will not only be of some immediate practical value, but also will generate specific, scientific research on the subject. Ten broad topics are covered: (1) the nature of the problem; (2) information, the user, and the universe of knowledge; (3) user needs and user behavior; (4) the prelude to service--surveys, appraisal, acquisition; (5) the user in the search room--improving manual systems; (6) machine readable archives; (7) automation in the search room; (8) networks; (9) beyond the search room--extension services; and (10) the user and the future--education, research and development. A bibliography is also provided. (DMC).

512,804

ED-246 907 Not available NTIS
Council on Library Resources, Inc., Washington, DC.
Bibliographic Services and User Needs. Report of a Conference Sponsored by the Council on Library Resources (Kansas City, Missouri, December 14-16, 1983).
P. Peterson. Mar 84, 114p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

To help determine the future of the Bibliographic Service Development Program (BSDP), the Council on Library Resources (CLR) sponsored a conference to examine bibliographic services for library users with emphasis on their needs. The 32 participants included invited speakers, research library administrators, foundation officers, network and computing center administrators, library/communications school faculty, CLR board members, CLR staff, and BSDP Program Committee members. Four challenge or discussion papers were given at the conference: 'The Academic Community and Bibliographic Services,' by Thomas H. Martin; 'Bibliographic Access: Problems and Prospects,' by Douglas Ferguson; 'Integrated Academic Information Systems: The Bibliographic Interface,' by Nina W. Matheson; and 'The Knowledge Business: Economic Issues of Access to Bibliographic Information,' by Carlton Rochell. Four working groups, following the themes of the papers, met later to discuss the issues. Their collective recommendations were refined by the entire group into a set of priorities for Council action. This report consists of the recommendations of the conference, the four discussion group reports, the four formal papers, a background paper ('Five Years of the Bibliographic Service Development Program: 1979-1983,' by C. Lee Jones), and opening session summaries. It also includes the agenda of the meeting, the set

of challenge questions prepared beforehand, and a list of participants. (Author/DMC).

512,805
ED-246 908 Not available NTIS
Collection Access Policy,
D. A. Fiste. 1984, 29p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Focusing on cataloging operations contingent upon public catalog usage, this article identifies necessary components of a collection access policy, discusses representative samples of policies that can be adapted to individual library practices, and provides guidelines for the development and implementation of a statement useful for planning future services. Sections include catalog and file maintenance, AACR2 impact, retrospective conversion, departmental workflow, special materials, OCLC usage, classification, descriptive cataloging, and backlog control. A 5-year (1979-1983) literature survey provides current documentation. In addition, background information and commentary are included. Guidelines are formulated as a basis for developing a written manual for library staff usage. (Author/DMC).

512,806
ED-246 910 Not available NTIS
Loyola Marymount Univ., Los Angeles, CA.
Interlibrary Loan Policy and Procedures,
L. Kite. Jun 83, 49p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

The interlibrary loan policies of the reference department of the Charles Von der Ahe Library at Loyola Marymount University are detailed in this policy statement. The document is divided into four main sections: policy for borrowing, procedures for borrowing, policy for lending, and procedures for lending. In addition to the policy statement, 19 appendices provide samples of forms used in the interlibrary loan process. (DMC).

512,807
ED-246 912 Not available NTIS
Association of Research Libraries, Washington, DC.
Microform Sets in U.S. and Canadian Libraries. Report of a Survey on the Bibliographic Control of Microform Sets Conducted by the Association of Research Libraries Microform Project,
J. Heynen. 1984, 109p ISBN-0-918006-08-2
Questionnaire printed on colored paper; may not reproduce well.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This report describes the background of the Association of Research Libraries Microform Project and summarizes results of the survey from which the database of the project's clearinghouse on the bibliographic control of microforms has been constructed. The Microform Project was established in 1981 to assist libraries, microform publishers, and the bibliographic utilities in their efforts to achieve bibliographic access to titles in microform sets. The primary tool in providing this assistance is a Microform Cataloging Clearinghouse, the main purposes of which are to facilitate the cataloging of titles in microform sets and prevent duplication of effort. The clearinghouse database is based on the results of a survey sent to participants in the four major bibliographic utilities as well as the few major libraries that do not participate in them. The 535 useful survey returns which were received show that a large number of libraries catalog titles in microform sets and that most of them create machine-readable records for at least some of the sets they catalog. A copy of the survey questionnaire and additional information on the survey and the clearinghouse are appended. (DMC).

512,808
N85-12785/0/GAR PC **E01**
National Aeronautics and Space Administration, Washington, DC.
Nasa Thesaurus Supplement: A 3-Part Cumulative Supplement to the 1982 Edition of the NASA Thesaurus.
Jul 84, 29p NAS 1.21:7051(Sup-2), NASA-SP-7051(Sup-2)

The three part cumulative NASA Thesaurus Supplement to the 1982 edition of the NASA Thesaurus includes: part 1, hierarchical listing; part 2, access vocabulary, and part 3, deletions. The semiannual supplement gives complete hierarchies for new terms and includes new term indications for terms new to this supplement.

512,809
N85-12786/8/GAR PC **A07/MF A01**
Fondo Colombiano de Investigaciones Cientificas y Proyectos Especiales, Bogota.
Cartilla Para El Registro de la Informacion Tecnica en la Industria (Primer on the Registration of Technical Information in Industry).
G. C. Caro, and C. M. Gutierrez. 1983, 131p
Text in Spanish.

Some methods of recording information about processes, raw materials, plans, models, and other factors germaine to industrial production in formats that are suitable for classification in accordance with the needs of the enterprise are presented. Pilot trials for information recording were carried out in the enterprises of Induacopies, Racores de Colombia, Metalfisher by Cerverceria Andina. Deficient recordkeeping can result in: lack of valid data for improving production processes and products; impossibility of controlling manufacturing costs; deficient infrastructure for acquiring technology available on the international market; impossibility of capitalizing on technological resources; and difficulty of adopting quality control systems. Other points analyzed are: prototypes, value analysis, and codification with sample forms for keeping records on machinery, tools, processes, etc.

512,810
N85-12787/6/GAR PC **A02/MF A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
NSSDC and WDC-A-R and S Document Availability and Distribution Services.
Oct 83, 15p NAS 1.15:87374, NSSDC/WDC-A-R/S-83-15, NASA-TM-87374

Documents available from the national space science data center (NSSDC) and the world data center A for rockets and satellites (WDC-A-R&S), are described. The availability, costs, ordering procedures for documents presently available, and the procedures for obtaining future documents are given.

512,811
PB84-216092/GAR PC$13.00/MF **A01**
National Library of Medicine, Bethesda, MD.
Medical Subject Headings, Tree Structures, 1985.
Jul 84, 474p NLM/MED-84/04
Supersedes PB83-223164. See also PB84-216084, and PB84-216100.

All Medical Subject Headings currently in use by the National Library of Medicine's indexers, catalogers, and searchers are arranged in a hierarchical manner showing relationships between broader and narrower terms. Included are minor and geographic descriptors.

512,812
PB84-216100/GAR PC$12.00/MF **A01**
National Library of Medicine, Bethesda, MD.
Permuted Medical Subject Headings, 1985.
Jul 84, 384p NLM/MED-84/05
Supersedes PB83-234781. See also PB84-216084, and PB84-216092.

Permuted Medical Subject Headings, 1985, is a computer-generated display of all terms, i.e., descriptors and cross references, in the alphabetic list of the National Library of Medicine's Medical Subject Headings (MeSH) for 1985, as well as all citation type, check tag, and geographic descriptors in the Annotated Alphabetic MeSH, 1985. The Permuted MeSH takes each significant word that appears in each MeSH term and then lists all the MeSH terms in which that word appears.

512,813
PB85-137305/GAR PC **A04/MF A01**
Environmental Protection Agency, Washington, DC. Office of Toxic Substances.
TSCA (Toxic Substances Control Act) Confidential Business Information Security Manual.
Oct 84, 60p EPA/560/7-84/002

The procedures in this manual prescribe standards and establish responsibility and accountability for the control of documents and computer systems that contain Confidential Business Information (CBI) received by the U.S. Environmental Protection Agency (EPA) under the Toxic Substances Control Act (TSCA).

512,814
PB85-138816/GAR PC **E14/MF E14**
National Board for Science and Technology, Dublin (Ireland).
Science and Engineering Expertise in Irish Higher Education: Directory of the Research and Professional Interests of Personnel in the Science and Technology Departments of Irish Colleges.
May 84, 328p ISBN-0-86282-055-3
Revision of document dated March 1981.

The aim of this directory, when first published in 1981, was to provide a statement of the most important resources - the personnel - engaged in scientific and technological activities in Irish colleges of higher education. Since that time there has been a growing awareness of the important role which the higher education sector can play in supporting manufacturing industry. The NBST has developed a number of mechanisms in order to foster research and development links between colleges and industry, including the Higher Education - Industry Co-operation Scheme, and more recently a Co-operative Research and Development Program promoted jointly with the IDA. These actions have sought to encourage direct links between industry and the range of expertise which is outlined in this directory.

512,815
PB85-145597 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Planning, Budgeting and Personnel Management in a Scientific Library of the Federal Government.
Final rept.,
M. A. Bond. 1984, 16p
Pub. in Sci. Technol. Libraries 4, n3/4 p45-60 1984.

Planning, budgeting, and personnel management as practiced in a sci-tech library of an Executive Agency in the Federal government are discussed. Examples of particular planning accomplishments are provided, a budget cycle is detailed, and some of the dynamics of the personnel process are reviewed.

5C. Economics

512,816
AD-A148 790/9/GAR PC **A06/MF A01**
Naval Postgraduate School, Monterey, CA.
Fiscal Year 1983 Prompt Payment Act Performance.
Master's thesis,
R. W. Freitas. Jun 84, 109p

This thesis studies the problems of Coast Guard payment offices in making timely commercial invoice payments, and the accuracy of reports of interest penalties and early payments, required by the Prompt Payment Act and OMB Circular No. A-125. The results of this study indicate errors in the collection of early payment and interest penalty data, and subjective interpretations as to the causes for such payments and penalties. A review of these reasons and other problems leads to the development of several models to estimate the magnitude of such payments and to evaluate the relative performance of payment offices. This review also indicates the desirability of automation, administrative measures to reduce early payments and interest penalties, and improved reporting.

512,817
AD-A148 822/0/GAR PC **A09/MF A01**
Corps of Engineers, Fort Belvoir, VA. Water Resources Center.
Waterborne Commerce of the United States, Calendar Year 1982. Part 1. Waterways and Harbors, Atlantic Coast.
Annual publication for CY 1982.
Jul 84, 198p Rept no. WRSC-WCUS-82-1
See also Part 2, AD-A147 439.

This is one of a series of five publications containing statistics on the commercial movement of foreign and domestic cargo. WCUS, Part 1, presents detailed data by commodity and traffic for the waterways and har-

bors on the Atlantic Coast. The statistics include commodities given in short tons (2000 lbs) and vessel trips for the harbors and waterways.

512,818
AD-A148 823/8/GAR PC A05/MF A01
Corps of Engineers, Fort Belvoir, VA. Water Resources Center.
Waterborne Commerce of the United States, Calendar Year 1982. Part 3. Waterways and Harbors, Great Lakes.
Annual publication for CY 1982.
Jul 84, 96p Rept no. WRSC-WCUS-82-3
See also Part 4, AD-A148 824.

This is one of a series of five publications containing statistics on the commercial movement of foreign and domestic cargo. WCUS, Part 3, presents detailed data by commodity and traffic for the waterways and harbors on the Great Lakes. The statistics include commodities given in short tons (2000 lbs) and vessel trips for the harbors and waterways.

512,819
AD-A148 824/6/GAR PC A07/MF A01
Corps of Engineers, Fort Belvoir, VA. Water Resources Center.
Waterborne Commerce of the United States, Calendar Year 1982. Part 4. Waterways and Harbors, Pacific Coast, Alaska and Hawaii.
Annual publication for CY 1982.
Jul 84, 127p Rept no. WRSC-WCUS-82-4
See also Part 5, AD-A148 825.

This is one of a series of five publications containing statistics on the commercial movement of foreign and domestic cargo. WCUS, Part 4, presents detailed data by commodity and traffic for the waterways and harbors on the Pacific Coast, Alaska and Hawaii. The statistics include commodities given in short tons (2000 lbs) and vessel trips for the harbors and waterways.

512,820
AD-A148 825/3/GAR PC A06/MF A01
Corps of Engineers, Fort Belvoir, VA. Water Resources Center.
Waterborne Commerce of the United States, Calendar Year 1982. Part 5. National Summaries.
Annual publication for CY 1982.
Jul 84, 110p Rept no. WRSC-WCUS-82-5
See also Part 1, AD-A148 822.

This is one of a series of five publications containing statistics on the commercial movement of foreign and domestic cargo. WCUS, Part 5, presents a national summary of tons and ton-miles contained in the WCUS Publications 1 - 4.

512,821
ED-246 893 Not available NTIS
International Extension Coll., Cambridge (England).
Cost of Distance Education. IEC Broadsheets on Distance Learning No. 17.
H. Perraton. 1982, 71p ISBN-0-903632-28-4
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

One of a series offering practical advice and information on distance teaching, this broadsheet first looks at the reasons for trying to measure distance teaching costs and the methodological and economic difficulties involved in such measurements. Broadcasting and print costs in distance teaching are discussed, and evidence about the costs of distance teaching projects is compared, where possible, with the cost of conventional alternatives. Specific methods for analyzing costs are divided into those of particular value to either managers or to economists. Topics discussed in relation to costing for management include allocating costs, the cost of a course, the Snowden-Daniel variation, and measuring the cost of teaching, while the discussion of costing for economic analysis covers cost analysis, working out the costs, social discount rates, and the problem of cost variations over time. Conclusions include speculations on the future of distance education and cost-related factors. A list of inflation rate conversion factors is appended, and a 25-item reference list, 13 tables, and 4 figures are included. (LMM).

512,822
ED-246 898 Not available NTIS
Department of Communications, Canberra (Australia).
Potential Use of the Australian Satellite Communications System for School of the Air and Enhanced Educational Services. Report Prepared for the Commonwealth/State Advisory Committee on the Educational Use of Communications Technology.
N. G. Davies, and J. A. Gillam. Mar 83, 82p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This report considers the potential for the use of the Australian Communications Satellite System (ACSS) for the Australian Schools of the Air (SOTAs) and the delivery of enhanced educational services, and develops the concept of all SOTAs operating through one transponder in a national beam. An evolutionary introduction of satellite transmission for teacher-to-student links and use of a combination of satellite, telephone, and HF transmission facilities for student-to-teacher links are specifically suggested. Cost estimates for various alternatives in implementing improved SOTAs are developed for comparative purposes. Discussion of enhanced educational services includes the identification of transmission facilities that could be provided through satellite links. In particular, the part-time use of the Homestead and Community Broadcasting Satellite Service (HACBSS) 30-watt transponder for broadcasting of educational television programs and of the 12-watt transponders for television distribution to schools is examined. Appendices include a calculation of the number of sound program channels of specified quality, a link analysis of student response channels, a link analysis for television transmission using a 12-watt transponder, a scenario for the evolutionary introduction of satellite communication links in the SOTAs, and estimates of transmission costs. (LMM).

512,823
N85-12804/9/GAR PC A02/MF A01
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Um Modelo Estcastico Para Otimizacao Do Consumo E Exploracao de Um Recurso Natural Nao-Renovavel (A Stochastic Model for Optimizing the Consumption and Exploration of Nonrenewable Natural Resources).
A. Z. Milioni, and P. R. Demorais. Jun 83, 20p INPE-2770-PRE/343
In Portuguese; English Summary. Presented at the 16TH Simp. Brasileiro de Pesquisa Operacional, Florianapolis, Brazil, Oct. 1983.

Deshmukh and Pliska's model, for optimally consuming a natural resource and exploring for new sources of supply of that resource, in the presence of uncertainties is applied to the case of optimal consumption and exploration of Brazilian oil. A numerical method was required to obtain an approximate solution to an integro-differential equation. Other problems studied are the effects on the optimal consumption and exploration policies caused by changes in parameters like: oil extraction costs, imported oil prices, maximum rate of oil extraction and investment on exploration for new sources of supply.

512,824
PB84-928048/GAR PC E07/MF A01
Central Intelligence Agency, Washington, DC.
OECD (Organization for Economic Cooperation and Development) Trade with Asia.
Sep 84, 141p GI-84-10162, DI-84-10033
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB84-928000.

This publication is the last of a series of reference aids that provide the most recent detailed commodity statistics of OECD trade with different regions of the world. In this reference aid, data are provided on total OECD trade with Asia, trade of the five largest OECD countries with the region, and US trade with selected Asian countries. We plan to update the reference aids annually because of the interest in the LDC debt problem and interregional trade patterns.

512,825
PB85-130045/GAR PC A03/MF A01
International Bank for Reconstruction and Development, Washington, DC. Economic Development Inst.
Working Capital, Rural Nonfarm Firms and Rural Financial Markets.
Discussion paper,
P. Kilby, C. Liedholm, and R. L. Meyer. Sep 81, 35p DP-5, AID-PN-AAJ-968
Contract AID/TA-BMA-7
Presented at Colloquium on Rural Finance, September 1-3, 1981, Washington, DC. Prepared in cooperation with Ohio State Univ., Columbus.

Although rural non-farm activities are an important component of the rural economy, they have generally been overlooked by those examining rural financial markets. Yet, the fungibility of finance, particularly for working capital, insures that they are an integral part of the relevant terrain. The relationship of these activities to the rural household are examined; quantitative benchmarks of rural non-farm enterprises, particularly those engaged in manufacturing, and their use of working capital are presented. A demand and supply analysis of working capital with reference to rural manufacturing is developed and the results of econometric tests of several emerging hypotheses are reported for Sierra Leone. Several policy recommendations for strengthening rural financial markets are provided.

512,826
PB85-130052/GAR PC A03/MF A01
International Bank for Reconstruction and Development, Washington, DC. Economic Development Inst.
Savings Mobilization: The Forgotten Half of Rural Finance.
Discussion paper,
R. C. Vogel. Sep 81, 35p DP-6, AID-PN-AAJ-969
Contract AID/TA-BMA-7
Presented at Colloquium on Rural Finance, September 1-3, 1981, Washington, DC. Prepared in cooperation with Ohio State Univ., Columbus.

This paper presents four arguments that savings mobilization should be an essential part of rural finance projects in developing countries: (1) income distribution, (2) resource allocation, (3) viability of financial institutions; and (4) appropriate incentives for projects. The paper then describes the recent AID-BANCOOP project in Peru which demonstrates that savings can in fact be mobilized in rural areas of developing countries and which also indicates some of the crucial factors in successful savings mobilization: adequately high interest rates on deposits, good service for depositors, incentives for employees, confidence in the institution, and effective savings mobilization campaigns. Finally, the experience of credit unions in Peru is used to show what happens to financial institutions that do not pay adequate attention to savings mobilization and what problems, especially with respect to incentives, can be anticipated in implementing savings mobilization projects.

512,827
PB85-131795/GAR PC A03/MF A01
International Bank for Reconstruction and Development, Washington, DC. Economic Development Inst.
Critique of Traditional Agricultural Credit Projects and Policies,
D. W. Adams, and D. H. Graham. Sep 81, 49p
BACKGROUND PAPER-1, AID-PN-AAJ-974
Contract AID/TA-BMA-7
Prepared in cooperation with Ohio State Univ., Columbus. Presented at Colloquium on Rural Finance, September 1-3, 1981, Washington, DC.

Although over $5 billion has been spent in the past several decades on rural financial market (RFM) projects in developing countries, the emphasis of these projects on loans to stimulate productivity and to help the poor has diverted attention from the basic role which RFM's ought to play in development. This report critiques the results, assumptions, and policies associated with agricultural credit projects in low-income countries; summarizes new perspectives on RFM's; and makes suggestions for improving RFM projects.

512,828
PB85-133619/GAR PC A05/MF A01
Boston Univ., MA.
Comparative Advantage in Egyptian Manufacturing Reports Submitted to U.S. Agency for International Development (USAID).
Industrial sector strategy assessment,
R. E. B. Lucas. Dec 81, 92p AID-PN-AAL-655

Future investment in Egypt's rapidly expanding manufacturing sector should be directed to productive job

creation, where productivity is defined in terms of real social prices rather than the currently prevailing prices of commodities and labor. Two studies (along with an executive summary of the first) are here presented on the comparative investment advantage of various Egyptian industries. The first paper reviews the investment potential of 26 industries, classifying them, respectively, as those warranting, possibly warranting, and not warranting investment. The second study reviews current studies which use the domestic resource cost of foreign exchange to analyze the comparative investment advantage of Egyptian industries and reports on new calculations made on the basis of data from the 1977 input-output tables, from the Development Industrial Bank and the Investment Authority on individual enterprises, and on specific products within the engineering sector. Both studies were limited by the lack of public sector data.

512,829
PB85-133627/GAR PC **A05**/MF **A01**
Boston Univ., MA.
Private Sector Industrial Development Strategy: Egypt.
Industrial sector strategy assessment,
P. G. Clark. Dec 81, 86p AID-PN-AAL-658

Private sector expansion has been a key feature of Egypt's economy since a strategy for private sector industrial development was adopted in 1973 through Egyptian Law 43. With the aid of data obtained from a survey of 46 private companies and 14 banks, this report reviews the economic impacts and policy implications of the Law 43 development strategy. The report first reviews the experience of private companies, both those formed under Law 43 and others, and notes the private sector's growing share of production. Proposals for further stimulating private sector growth are listed. The second part of the paper examines the role of industrial exports in private sector development and profiles the export capabilities of the surveyed companies. Export trends and current and future industrial export policies are also discussed. A final section treats industrial financing for private sector development, the structure of financial institutions, private sector financing needs, and financing policies for the 1980's. Each section concludes with a consideration of the possible contributions of external donors to the development strategy. Ten tables of statistics are attached.

512,830
PB85-133643/GAR PC **A05**/MF **A01**
Agricultural Cooperative Development International, Washington, DC.
Cooperative System in Costa Rica.
Aug 82, 87p AID-PN-AAL-403

To determine the potential of Costa Rican cooperatives to respond to recent government statements stressing their importance in promoting economic democracy, this report examines the legal framework of the cooperative system; describes the Costa Rican financial system and cooperative finance; and analyzes three national cooperatives - the Costa Rican Bank for Cooperation (BANCOOP), the National Institute for the Development of Cooperatives (INFOCCOP), and the National Council of Cooperatives (CONACOOP) - as well as other key organizations and secondary and primary cooperatives. The authors conclude that the Costa Rican cooperative system is one of the nation's best alternatives for organizing and achieving economic development. Recommendations for making the cooperative system even more dynamic and socially relevant are included.

512,831
PB85-137008/GAR PC **A03**/MF **A01**
Luggage and Leather Goods Manufacturers of America, Inc., New York.
Export Development for the U.S. Luggage Industry. Volume 1. Part 1. Executive Summary.
Final rept.
Jan 84, 34p ITA-85-26-007
Grant ITA-99-26-07123-30
See also PB85-137016. Prepared in cooperation with Weintraub (Emanuel) Associates, Inc., Fort Lee, NJ.

Summarizes two reports -- one on export development for the U. S. luggage industry and the other on requirements for a foreign buyers manual for the industry.

512,832
PB85-137016/GAR PC **A14**/MF **A01**
Luggage and Leather Goods Manufacturers of America, Inc., New York.
Export Development for the U.S. Luggage Industry. Volume 1. Part 2.
Final rept.
Jan 84, 308p ITA-85-26-008
Grant ITA-99-26-07123-30
See also Volume 2, PB85-137024. Prepared in cooperation with Weintraub (Emanuel) Associates, Inc., Fort Lee, NJ.

Study identifies 10 foreign markets out of a list of 32 where the criteria are favorable export conditions may exist. Data is collected and organized that would be helpful to U. S. luggage manufacturers on each country, as well as the identification of potential foreign buyers, where possible.

512,833
PB85-137024/GAR PC **A09**/MF **A01**
Luggage and Leather Goods Manufacturers of America, Inc., New York.
Export Development for the U.S. Luggage Industry. Volume 2. Information Required for the Publication of a Foreign Buyers' Manual.
Jan 84, 188p
Grant ITA-99-26-07123-30
See also PB85-137016.

The information provided in this report (in manuscript form) is intended to serve as the 'main body' of a Foreign Buyer's Manual that will be printed, then distributed to potential foreign buyers of U.S. made luggage, and to other related agencies and organizations who might be in a position to assist foreign buyers of luggage items in their efforts to source from within the United States.

512,834
PB85-138410/GAR PC **E04**/MF **E04**
Transport and Road Research Lab., Crowthorne (England).
Effect of the Tyne and Wear Metro on Residential Property Values.
Supplementary rept.,
M. W. Pickett, and K. E. Perrett. c1984, 35p TRRL/SR-825

Investment in public transport can affect more than those who use the improved systems. The areas through which the new system operates can benefit in a number of ways. This report describes an exercise which monitors the effect that the opening of the new Tyne and Wear Metro had on the value of residential properties in the districts through which the lines pass. Some of the methods of analysis used in other countries are discussed together with the types of data that were available for collection in Tyne and Wear. Three different methods of analysis were undertaken on the data collected. (Copyright (c) Crown Copyright 1984.)

512,835
PB85-138469/GAR PC **E05**/MF **E05**
Bank of England, London.
Exchange Rate Variability: Evidence for the Period 1973 - 1982,
D. G. Barr. c1984, 66p BE/DP/TS-11, ISBN-0-903312-69-7

The objective of this paper is to present evidence on the level of exchange rate variability for the period 1973-1982. A variety of exchange rates and measures of variability is considered, but no attempt is made to assess the effects of variability. (The first section of the paper presents a brief survey of the available literature on these effects.) The creation of the European Monetary System (EMS) and its flexible fixed rate system, the exchange rate mechanism (ERM), in 1979 produced a significant change in the international economic structure and this paper attempts to assess how far exchange rate variability has changed since that date. (Copyright (c) Bank of England 1984.)

512,836
PB85-139038/GAR PC **E06**/MF **E06**
Sussex Univ., Brighton (England). Science Policy Research Unit.
Government Policy for the Offshore Supplies Industry. Britain Compared with Norway and France.
Occasional paper series,
L. Cook, and J. Surrey. c1983, 111p SPRU/OP/SER-21, ISBN-0-903622-22-X-OP-21

This study forms part of wider research into the development of the offshore supplies industry. When the project was conceived in 1981-82 there was particular interest in problems such as the impact of the massive investment on the economy, the sharp changes in demand, the unreliability of cost forecasts, the problem of coordination (particularly over gas gathering and shared oil pipelines), and the extent and methods of offshore research funding. For all these purposes a broad understanding of the industry was required. As the work progressed it became more evident that policy towards the offshore supplies industry was a particularly interesting example of the promotion, in several countries, of new high technology activities with possible export potential. (Copyright (c) Science Policy Research Unit University of Sussex October 1983.)

512,837
PB85-139178/GAR PC **A02**/MF **A01**
Foreign Agricultural Service, Washington, DC.
U.S. Meat and Dairy Imports for October and August and September 1984.
Foreign agriculture circular.
Nov 84, 20p FDL-MT-11-84
See also PB85-119592.

The report contains monthly data on imports of meat subject to the meat import law; imports of cheese and other quota dairy products, subject to licensing requirements; and imports under quota, not subject to licensing requirements.

512,838
PB85-139376/GAR PC **E04**/MF **E04**
Transport and Road Research Lab., Crowthorne (England).
Modelling the Car Market.
Laboratory rept.,
J. C. Tanner. c1984, 43p TRRL/LR-1116

Two simplified models of the secondhand car market are developed. These are then used to show some of the effects that would follow from changes in the number of company cars, in the prices of new cars and in the running costs of cars. In one model all cars are the same except in respect of their ages; their life and the pattern of prices are determined by the numbers of motorists willing to pay for the varying levels of service provided by cars of different ages. In the other model, cars differ also in engine size, and secondhand prices are determined by the price of new cars providing equivalent levels of service. In most respects the models give similar estimates of the effects of the postulated changes on the life of cars; the second model also indicates the effect on the average size of cars. (Copyright (c) Crown Copyright 1984.)

512,839
PB85-140580/GAR PC **A09**/MF **A01**
Agency for International Development, Washington, DC.
Assisting Small Business in Francophone Africa: The Entente Fund African Enterprises Program.
Project impact evaluation rept. no. 40,
R. C. Malley, C. Claude, A. Morton, J. Murphy, and W. Wolff. Dec 82, 194p AID-PN-AAL-002

The program to assist African enterprises through the Entente Council (made up of five countries--the Benin, Ivory Coast, Niger, Togo, and Upper Volta) has been an important part of AID's total effort in French West Africa since 1973. AID's objectives in the African Enterprises program may be divided into two parts--first, to help African entrepreneurs by lending money and providing technical assistance to the Entente Fund, which would relend and provide technical help to six development banks in the member countries (two in the Ivory Coast, one in each of the other four countries), which in turn would subland to African-owned enterprises; and second, to help strengthen the ability of these development banks, plus the promotion centers and guaranty funds to assist African-owned companies, and to encourage commercial bank lending to African entrepreneurs.

512,840
PB85-145167 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Role of Government in Supporting Measurement Standards for High-Technology Industries.
Final rept.,
G. Tassey. 1982, 10p
Pub. in Research Policy 11, n5 p311-320 Oct 82.

The role of voluntary standards in industrial growth is discussed by characterizing standards as a public good and identifying the consequent determinants of underinvestment by the private sector. Underinvestment results from the nature of both the standard itself and the underlying technology. The focus is on measurement technologies which require capital-intensive research facilities, specialized equipment and labor, and concensus building among buyers as well as sellers in order to implement them. Standards and the underlying measurement technologies which have been instrumental in the emergence of the optical fiber industry are discussed as an example. Finally, some implications are drawn for industrial growth policy.

512,841
SHR-0010577/GAR PC A16/MF A01
Hebrew Rehabilitation Center for Aged, Roslindale, MA. Dept. of Social Gerontological Research.
Domiciliary Care Programs Across the Nation: Implementing an Option in Long Term Care. Volume 1 and 2,
S. Sherwood, C. E. Gutkin, C. C. Sherwood, and V. Mor. Mar 82, 370p
Contract SSA-600-79-0096
Prepared in cooperation with Boston Univ., MA. School of Social Work.

Using secondary data analyses of available data, this study examines domiciliary care living arrangements (as defined by the Social Security Administration) as a potentially viable publicly supported, cost contained, and appropriate service delivery mechanism for vulnerable persons requiring long-term care services. Clients can pay for these residential care arrangements with Federal Supplemental Security Income (SSI) and State optional supplementation to the Federal payment. The care does not involve direct provision of medical and nursing care by the facility, and the facility does not qualify as a Medicaid-certified facility. The report descriptively analyzes domiciliary care by client group and funding features as well as domiciliary care's goals. It examines the extent to which program and regulatory elements impinge on the achievement of these goals and the supply and usage of domiciliary care within each State. These goals include ensuring safe and sanitary environments, having clients and their families participate in decisionmaking, using standardized procedures for assessing eligibility and implementing appropriate placement, and ensuring that SSI clients have financial accessibility to residency in a domiciliary program facility based on the SSI dollar amount received. Data for these secondary analyses cover all 50 States and the District of Columbia and were gathered through a national mail survey. The report contains numerous tables and some footnotes.

512,842
SHR-0010605/GAR PC A02/MF A01
Denver Research Inst., CO. Social Systems Research and Evaluation Div.
Board and Care for Elderly and Mentally Disabled Populations: Abstract.
Final rept.,
N. D. Dittmar, G. P. Smith, J. C. Bell, C. B. C. Jones, and D. L. Manzanares. Mar 83, 21p
Contract DHHS-100-79-0117
See also SHR-0012170, SHR-0010581, SHR-0010585, and SHR-0010567.

Results of a survey and systems analyses of board and care homes serving the elderly and mentally disabled populations in seven States (California, Colorado, Florida, Massachusetts, Minnesota, Texas, and Washington) vividly document the inequities of Federal and State human services systems. These systems philosophically and financially support the care and treatment of the mentally retarded while relegating to the back wards of communities the mentally ill and poor elderly. These differences in care are due to the availability of resources. The analyses focused on the differences among board and care homes serving the mentally retarded, the mentally ill, and the elderly, small intermediate care facilities for the mentally retarded, and single room occupancies. Specific findings focus on size, location, ownership, fees, regulation, staffing, services, general atmosphere, fire safety, employment, physical status, socialization and recreation, and friends and family living nearby. Study findings suggest that the quality of life experienced by board and care residents varies from poor to excellent. Recommendations focus on developing a minimum set of standards for board and care homes; increasing the funding for board and care homes, especially those serving the mentally ill and elderly; and expanding in-home care programs to reduce the demand for residential care.

512,843
SHR-0011731/GAR PC A04/MF A01
National Policy Center on Employment and Retirement, Los Angeles, CA.
Employee Benefit Costs for Workers at Older Ages: Implications for Management,
C. E. Paul. Feb 83, 71p
Grant AOA-90-AP-0002(02)

Results are presented of a survey conducted in the business community on the cost experiences, as well as cost perceptions, of organizations that currently have a number of older workers continuing to work past normal retirement age and that have been offering part-time options to them. Less than one-half of the 22 companies had actually studied the cost of providing benefits for employees of different ages; however, 20 firms indicated that they believed that at least some employee benefits can cost more for older workers. Among those 20 organizations, however, only five stated that the issue of greater benefit costs for older personnel posed an actual problem for management. Approximately one-half of the 22 firms indicated that their benefit costs were nearly the same for part-time staff as for full-time staff. Fifteen of the firms expressed interest in having the government help them in controlling health care costs. Among their recommendations were to: (1) retain Medicare as first payor for health care benefits of workers aged 65 and older; and (2) increase Medicare benefit coverage.

5D. History, Law, and Political Science

512,844
AD-A148 612/5/GAR PC A10/MF A01
Naval Postgraduate School, Monterey, CA.
Asean and Indochina: A Strategy for Regional Stability in the 1980's.
Master's thesis,
J. R. Caswell. Dec 84, 207p

This thesis suggest a reassessment of United States and Southeast Asian policy towards Vietnam and the other Indochinese states. The hypothesis behind this suggestion is simply that the current policies of isolation imposed on Indochina do little to promote stability in the region; drive Indochina further into the Soviet sphere; and do not serve the long range interests of the United States and other nations of the region. It explores the possibility of ASEAN-Indochinese rapprochement, based on encouraging proper interactive behavior by Indochina through linking such behavior to economic incentives. It is postulated that such actions can lead to regional interdependency and long term political stability. To this end, comparative national interests/policies are examined within the context of military, political, and economic interaction in Southeast Asia. Weaknesses and strengths are highlighted and areas for mutual cooperation explored. Options for the future are discussed and an emphasis on internal economic growth is suggested as the soundest path towards stability in Southeast Asia.

512,845
AD-A148 778/8/GAR PC A07/MF A01
Georgetown Univ., Washington, DC. Center for Strategic and International Studies.
Proliferation of Small Nuclear Forces.
Technical rept.,
R. W. Jones. 30 Apr 83, 140p DNA-TR-82-125, SBI-AD-E301 531
Contract DNA001-82-C-0119

The objective of this study is to identify and assess the implications of the proliferation of nuclear forces in the Middle East and South Asia for U.S. security interests, policies, and planning. To fulfill this objective, this study seeks to: 1) Project the potential size and capabilities of local nuclear forces, and define the spectrum of threats that such forces could pose to the security interests of the U.S. and of other important actors, both in this region and elsewhere; 2) Assess the probable impact of proliferating nuclear forces on international stability, military balances, the character of conflict, arms control issues, conventional arms competition and U.S. forces; 3) Assess how new nuclear powers will behave and how their neighbors and other nuclear powers will react; 4) Assess Soviet perception and response; 5) Identify the likely patterns and outcomes of nuclear and other military interaction, including perceptions, use of leverage, employment of force, conflict escalation, nuclear warfare, and crisis management, within and beyond the region of concern; 6) Discuss the implications for U.S. defense policy and planning, indicating areas in which future preparation or decisions may be called for.

512,846
N85-12806/4/GAR PC A02/MF A01
National Aeronautics and Space Administration, Washington, DC.
Structures and the Role of an International Agency for the Control of Satellites.
R. J. Dupuy. Jun 84, 13p NAS 1.15:76765, NASA-TM-76765
Contract NASW-3541
Transl. into English from Ann. Of Air and Space Law (Montreal), V. 6, 1981 p 333-341. Original Language Document Was Announced as A82-37836. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Legal questions involved in the liability of a proposed agency which would control internationally owned satellites for monitoring worldwide compliance with arms control agreements are discussed. Difficulties in acquiring the signed consent of all the relevant nations, and guaranteeing satisfactory compliance with the terms of such an agreement are noted. Additional problems to be solved comprise the construction of the ground based facilities and the satellites, the funding for the venture, and the reconciliation of the functions of the proposed agency with the sovereignty of individual states. The agency would gather, treat, and format data for signatories of arms control agreements and provide technical assistance in crisis conditions. It is concluded that the existence and functioning of the agency would reduce the amount of classified information and would consequently reduce the level of international tensions.

512,847
PB85-138451/GAR PC E05/MF E05
Transport and Road Research Lab., Crowthorne (England).
Effects of Wheel Clamping in Central London.
Laboratory rept.,
R. M. Kimber. c1984, 60p TRRL/LR-1136

The Transport and Road Research Laboratory was commissioned by the Secretary of State for Transport to evaluate the effects on parking and traffic behaviour of the use of wheel clamps to enforce parking regulations in central London. The report describes the results of the evaluation which was based on before and after studies. The most important conclusions were that although the number of illegal acts on yellow lines did not change appreciably the durations of parking acts and the parking density on yellow lines declined by 30-40 per cent, and the time taken up by illegal parking on yellow lines fell by 40 per cent. Changes in behaviour at parking meters were small and did not generally differ from changes in control areas. At residents' bays within the clamping zone the percentage of acts which were illegal fell from 35 per cent by about a third. Following the reductions in roadside parking densities on yellow lines, the journey times of test vehicles travelling at average traffic speeds within the road network declined with respect to equivalent measurements in control areas. (Copyright (c) Crown Copyright 1984.)

512,848
SHR-0011683/GAR PC A02/MF A01
Administration on Aging, Washington, DC.
Ombudsman Technical Assistance Manual. Chapter 4. The Use of Legal Resources,
R. Wainess. Jun 84, 18p AOA/IM-84/47
See also SHR-0011952.

Ombudsman programs at both the state and substate level are addressed. It is noted that an ombudsman program is frequently confronted with requests for legal assistance outside the scope of its services; therefore, an ombudsman program should have a list of attorneys' names and agencies for referral purposes. The most important way an ombudsman program can use lawyers is in the context of the program's own activities. It is suggested that ombudsman obtain a thorough understanding of the rights of resi-

dents to high quality care and treatment. The two groups of attorneys from whom an ombudsman program may seek legal assistance are examined: government-funded attorneys and private attorneys. It is suggested that law schools can also be relied on for help in special cases and will sometimes supply help on an ongoing basis.

512,849
SHR-0011952/GAR PC **A06**/MF **A01**
Administration on Aging, Washington, DC.
Ombudsman Technical Assistance Manual. Chapter 14. Publicity. Chapter 20. Developing a Coordinations Agreement between the Ombudsman Program and State Regulatory Agencies. Chapter 21. Ombudsman Involvement in Board and Care Facilities.
Sep 84, 104p
See also Chapter 4, SHR-0011683.

This memorandum transmits three chapters for the manual. Chapter XIV, on publicity, provides guidance for State and local ombudsmen in publicizing both the Ombudsman Program itself and news events or issues related to the Ombudsman Program. Publicity is essential to the operation of the program because it makes the program more visible. The purpose of Chapter XX is to guide State level ombudsman agencies in developing a coordination agreement between themselves and other State agencies, particularly the agencies which license nursing homes and board and care homes, for coordination of services and activities. Such agreements are important to avoid duplication of activities and gaps in services. Chapter XXI concerns ombudsman involvement in board and care facilities.

5E. Human Factors Engineering

512,850
AD-A148 641/4/GAR PC **A05**/MF **A01**
Science Applications International Corp., McLean, VA.
Integrated Plan for Human Performance Enhancement in C2 Operations.
Interim rept. Sep 83-Dec 84,
M. L. Fineberg. Nov 84, 94p SAIC-84/1825, ARI-RN-84-135
Contract MDA903-83-C-0475

In an effort to devise a long range plan for research into the human performance aspects of Command and Control, the Army Research Institute sponsored a C2 research planning project involving experts from both industry and academe. Its purpose was to generate a 10-year plan consisting of a series of integrated, deficiency-driven research programs to help the Army improve C2 systems performance. Pre-workshop assignments and workshop activities were designed to aid the consultants in identifying human performance deficiencies in the C2 operational environment, and then to help them select a subset of the most critical deficiencies on which to focus the next 10 years of research. The pre-workshop and workshop activities also involved the identification of technologies from cognitive, social and organizational psychology and from the human factors and artificial intelligence research communities which might be developed and applied most profitably to upgrade each deficient area. Originator-assigned keywords include: Battlefield automation, C2 human performance enhancement, Distributed C2, Expert systems, and Decision support.

5F. Humanities

512,851
AD-A148 602/6/GAR PC **A04**/MF **A01**
Southeastern Archeological Services, Inc., Athens, GA.
Cultural Resource Survey of Springfield Canal, Chatham County, Georgia.
Final rept.,
C. B. DePratter, and R. R.Doyon. 17 Sep 84, 71p
Contract DACW21-84-M-0314

Research on the Springfield Canal project, Chatham County, Georgia, consisted of a historic documents search and an archeological survey. The project area is on the western fringes of the city of Savannah in lowlands once drained by Musgrove Creek and its tributaries. The present Springfield Canal is the result of incremental development over a period of 150 years. A 200-foot-wide corridor along the existing 4.7-mile-long canal right-of-way was surveyed. No prehistoric sites were encountered during the field survey, but several significant historical features were identified. A segment of the Savannah and Ogeechee Canal channel now occupied by the Springfield Canal represents a significant episode in the history and development of the city of Savannah. That canal segment contains remains of two brick locks constructed between 1824 and 1831. Both the locks and the intervening canal segment should be considered eligible for nomination to the National Register of Historic Places. Two brick Central of Georgia Railroad viaducts (constructed in 1852 and 1859, respectively) cross this canal segment. These viaducts are within and part of the Central of Georgia Railroad Savannah Shops and Terminal Facilities, a Historic Landmark District.

512,852
AD-A148 690/1/GAR PC **A14**/MF **A01**
Iroquois Research Inst., Fairfax, VA.
Survey and Testing of Archaeological Resources at Clinton Lake, Kansas, 1978-1979.
Final rept. 1978-1979,
M. Nathan. Aug 80, 307p
Contract DACW41-78-C-0054

This report describes the results of testing and survey in portions of the Clinton Lake Project in northeastern Kansas. Field investigations were conducted during the summer of 1978 and the spring of 1979. Work involved the limited excavation of 19 previously located prehistoric sites and intensive survey of previously unsurveyed portions of the project. Archaeological components relating to the Archaic, Plains Woodland and Plains Village horizons were recognized. Analysis of prehistoric sites in the bottom-lands indicates that there was a marked preference for settlement on well drained soils. Originator-supplied keywords include: Wakarusa River.

512,853
AD-A148 715/6/GAR PC **A11**/MF **A01**
Arkansas Univ., Fayetteville. Dept. of Anthropology.
Analysis of Human Osteological Remains from Multi-County Areas, South Dakota.
Final rept. Aug 83-Nov 84,
J. C. Rose, M. K. Marks, M. Kay, and E. B. Riddick. Nov 84, 244p
Contract DACW45-83-M-2506

A minimum of 44 human skeletons both partial and complete had been recovered during fourteen salvage operations by Army personnel and the general public along with the shores of Lakes Oahe, Sharpe, and Francis Case. Both the human remains and artifacts contained in the fourteen collections were analyzed by the staff of the Anthropology Dep., Univ. of Arkansas. Originator supplied keywords include: Skeletal remains, Osteology, Pathology, Craniometrics, Nonmetric variants, and SEM micrograph.

512,854
AD-A148 719/8/GAR PC **A22**/MF **A01**
Nebraska Univ.-Lincoln. Div. of Archeological Research.
Archeological Investigations within Federal Lands Located on the East Bank of the Lake Sharpe Project Area, South Dakota. 1978-1979. Volume 2. Appendix 1 Contributing Reports A-H.
Final rept. 10 Jul 78-18 Apr 84,
C. R. Falk, T. L. Steinacher, D. L. Toom, W. W. Caldwell, and A. H. Coogan. Apr 84, 503p Rept no. TR-83-04-VOL-2-APP-1
Contract DACW45-78-C-1036

List of Contents: Archeological Investigations at the Whistling Elk Site; Archeological Investigations at the Diamond-J Site; Archeological Investigations at the Rousseau Site; Archeological Investigations at the Little Elk Site; Plains Woodland Period Mound Sites in the Lake Sharpe Area: East Bank; Prehistoric Ceramic Sites Located within the Lake Sharpe Area (East Bank), South Dakota; Prehistoric Lithic Sites in the Lake Sharpe Area; A Summary of Historic Sites Identified in the Lake Sharpe East Bank Survey Area.

512,855
AD-A148 744/6/GAR PC **A08**/MF **A01**
Birmingham Historical Society, AL.
Village Creek: An Architectural and Historical Resources Survey of the Village Creek Project Neighborhoods, City of Birmingham, Jefferson County, Alabama.
Final rept. 30 Mar-9 Nov 84,
C. L. Hudgins, and M. L. White. Nov 84, 167p
COESAM/PD-EC-84/005
Contract DACW01-84-C-0068

A cultural resources survey conducted by the Birmingham Historical Society from April to June 1984 recorded 651 domestic dwellings and other structures in selected sections of the flood plain of Village Creek, a small tributary of the Black Warrior River that meanders through the City of Birmingham. This creek played an important role in supplying the Magic City's first industries and inhabitants with water, but it is no longer considered a primary resource. Demographic and economic patterns in study areas with the three communities of East Lake, East Birmingham, and Ensley, while tied to booms and lulls in Birmingham's industrial economy, evolved on different tracks. The architectural character and history of each community was accordingly distinctive and revealed a close relationship between class and housing type. In addition, the shotgun house type exhibited an unexpected persistence in the black neighborhoods of Ensley that were included in the survey. This traditional house form was still being constructed in the 1960s in a community with a strong tradition of working class home owners and remarkable continuity in residency patterns.

512,856
AD-A148 781/8/GAR PC **A07**/MF **A01**
Nebraska Univ.-Lincoln. Div. of Archeological Research.
Archeological Investigations within Federal Lands Located on the East Bank of the Lake Sharpe Project Area, South Dakota: 1978-1979. Volume 1. Covering Report.
Final rept. 10 Jul 78-18 Apr 84,
C. R. Falk, T. L. Steinacher, D. L. Toom, and W. W. Caldwell. Apr 84, 141p Rept no. TR-83-04-VOL-1
Contract DACW45-78-C-1036
See also Volume 3, AD-A148 782.

Class III cultural resources investigations of all Federal lands along the east (left) bank of Lake Sharpe, South Dakota were carried out in 1978-1979 by the University of Nebraska for the U.S. Army Corps of Engineers, Omaha District. A total of 136 sites were investigated, including both prehistoric (n=92) and historic (n=59) components. Historic components represent both Native American and Euroamerican use of the project area. Plains Village period remains (n=49) make up a majority of the prehistoric components; Plains Woodland period (n=8) and Plains Archaic period (n=4) components are also identified. Resources on both the east and west banks of Lake Sharpe were considered in developing a Multiple Resource Nomination. Four districts were proposed, including a total of 118 sites. Ten individual site nominations were also proposed.

512,857
AD-A148 782/6/GAR PC **A14**/MF **A01**
Nebraska Univ.-Lincoln. Div. of Archeological Research.
Archeological Investigations within Federal Lands Located on the East Bank of the Lake Sharpe Project Area, South Dakota: 1978-1979. Volume 3. Appendix 1. Contributing Reports I-O. Appendix 2. Scope of Work, Amendment P00001.
Final rept. 10 Jul 78-18 Apr 84,
C. R. Falk, T. L. Steinacher, D. L. Toom, and W. W. Caldwell. Apr 84, 312p Rept no. TR-83-04-VOL-3
Contract DACW45-78-C-1036
See also Volume 1, AD-A148 781.

List of Contents: Notes on Prehistoric Lithic Resource Utilization in the Lake Sharpe Area; Analysis of Ceramic Materials from Sites 39HU97, 39HU214 and 39HU217, Lake Sharpe, South Dakota; Geological Site Reports, Lake Sharpe, South Dakota; Archeological Investigations in the Big Bend Reservoir: A Review; Notes on the Historical Cartography of the Lake Sharpe Area,1795-1892; Historical Background, Lake Sharpe Area, South Dakota; Architectural Reports for the Pierre and Fort Pierre Railway Bridge (Chicago and North Western Railway), and Old U.S. Highway 14 Bridge, Lake Sharpe, South Dakota.

512,858
AD-A148 796/6/GAR PC **A04**/MF **A01**

Iowa State Historical Dept., Iowa City. Div. of Historic Preservation.
Intensive Survey of Archaeological Site 13AN52.
Final rept. 1977-1979,
D. W. Benn, and D. M. Hovde. Aug 81, 72p
Contract DACW41-77-M-1672

This report describes the results of Phase II testing of 13AN52 which is one of 80 prehistoric sites and one of 2 Archaic sites known in the Rathbun Lake area, (which was tested by personnel from the Luther College). Although a burned rock midden and a distinct scatter of lithic waste and chipped stone tools were found, the site was too disturbed to attempt elaborate cultural reconstructions. The report notes that 13AN52 does not meet National Register of Historic Places criteria. Originator-supplied keywords include: Archeological site testing, South Central Iowa, and Chariton River.

512,859
PB85-145324 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Is Invention an Art. Since It Is Fun, Should Inventors be Paid.
Final rept.,
J. Rabinow. 1980, 4p
Pub. in Industrial Research/Development 22, n12 p88-91 1980.

Invention is an art form because it has the attributes of all arts: (1) It is the product of a person's mind. (2) It is the combination of prior knowledge, combined in new ways. (3) It requires a sophisticated audience well versed in the art to appreciate the product. (4) It produces an emotional reaction in the mind of a beholder so cultured. The talk relates anecdotes from my experiences and touches upon the fact that much of the present management of our technology does not appreciate the art.

5H. Man-Machine Relations

512,860
AD-A148 813/9/GAR PC **A05/MF A01**
Computer Technology Associates, Inc., Englewood, CO.
Draft Sector Suite Console Requirements Specification.
Rept. no. 5 (Final),
M. Phillips, and R. Church. 10 Aug 84, 76p DOT/FAA/AP-84/17
Contract DT-FA01-83-Y-10554

The Draft Sector Suite Console Requirements Specification itemizes the physical and performance characteristics of the AAS Sector Suite. The purpose of this document is to provide specifications that will ensure that the Sector Suite will accommodate the anthropometric and psychophysical attributes of the controller population. Functional capabilities are specified which support the controller-machine interface. Included topics in this specification are: definition of the SS workstation, input device requirements, output device requirements, physical characteristics, and environmental considerations. As such, these requirements address the operational controller-machine interface of the Sector Suite.

5I. Personnel Selection, Training, and Evaluation

512,861
AD-A148 586/1/GAR PC **A03/MF A01**
Washington Headquarters Services (DoD), DC. Directorate for Information Operations and Reports.
Department of Defense Military Manpower Statistics.
Jun 84, 46p Rept no. M03

Military Manpower Statistics (MMS) is a monthly publication prepared by the Washington Headquarters Services, Directorate for Information Operations and Reports (WHS/DIOR) of the Office of the Secretary of Defense. The MMS report presents audited statistical data pertaining to military personnel on active duty for the current fiscal year on a monthly basis. The March, June, September, and December issues contain quarterly summaries of certain military manpower data as annotated in the Table of Contents. Although these tables are revised quarterly, they are published without changes in two subsequent monthly editions of this publication. The publication is generated from a computerized data base developed and maintained by the Manpower Management Information Division.

512,862
AD-A148 587/9/GAR PC **A02/MF A01**
Washington Headquarters Services (DoD), DC. Directorate for Information Operations and Reports.
Department of Defense Civilian Manpower Statistics.
Aug 84, 13p Rept no. M04

Civilian Manpower Statistics (CMS) is published monthly by the Office of the Secretary of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (WHS/DIOR). CMS provides statistical information on the civilian work force of the Department of Defense (DoD), with the exception of personnel paid from non-appropriated funds. It is produced primarily from a computerized data base developed and maintained by WHS/DIOR from monthly information provided to the Office of Personnel Management on SF 113-A, Monthly Report of Federal Civilian Employment.

512,863
AD-A148 588/7/GAR PC **A02/MF A01**
Washington Headquarters Services (DoD), DC. Directorate for Information Operations and Reports.
Department of Defense Civilian Manpower Statistics.
Jul 84, 13p Rept no. M04

Civilian Manpower Statistics (CMS) is published monthly by the Office of the Secretary of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports. CMS provides statistical information on the civilian work force of the Department of Defense (DoD), with the exception of personnel of the National Security Agency and personnel paid from non-appropriated funds. It is produced primarily from a computerized data base developed and maintained by WHS/DIOR from monthly information provided to the Office of Personnel Management on SF 113-A, Monthly Report of Federal Civilian Employment.

512,864
AD-A148 590/3/GAR PC **A02/MF A01**
Oregon State System of Higher Education, Monmouth.
Research on the Technology of Item Writing.
Final rept.,
G. Roid, and T. Haladyna. Jun 79, 22p
Contract MDA903-77-C-0189

Research on new methods of writing test questions for use in instructional systems is summarized in this final report. Three tasks were completed: (1) experimental studies comparing several methods of transforming sentences from instructional materials into test questions, (2) a review of methods and an experimental study comparing the sentence-based questions with items written from learning objectives, and (3) the development of a Handbook on Item Writing for Criterion-Referenced Tests.

512,865
AD-A148 601/8/GAR PC **A08/MF A01**
Naval Postgraduate School, Monterey, CA.
Review of Military Recruiting Research.
Master's thesis,
J. J. Brown. Jun 84, 156p

The purpose of this thesis is to construct a comprehensive and systematic review of the existing research in the area of recruiting and recruiter productivity. The objective is to identify areas where further investigation and research would be beneficial. The need for further study will be defined by either a paucity of related studies and/or the desirability of updating completed research projects to achieve currency. The intent of this undertaking is not to provide a critical review of the studies investigated, but rather to simply identify holes in the research. The discovery of areas where little or no exploration has been attempted or where the research is no longer valid, in part or in whole, will identify the need to update the work. Information such as is contained in this thesis will facilitate better planning and research design, assist in prioritization of projects, and improve allocation of research and development monies.

512,866
AD-A148 608/3/GAR PC **A02/MF A01**
Army Research Inst. for the Behavioral and Social Sciences, Alexandria, VA.
Perspectives on the Utility of Systems Science in the Army.
Special rept.,
E. M. Johnson, and T. O. Jacobs. Oct 84, 22p Rept no. ARI-SR-S-8

This report presents the results of a conference designed to develop consensus on a workable definition of systems science, determine its potential for solution of Army problems, and develop recommendations for further work if such seems warranted. Conferees made a distinction between systems science (an emerging discipline) and systems approach (a body of systematic technologies). Areas of potential application were identified as those characterized by complexity (in systems of people, equipment, and missions), ongoing change (in structure or components), information flows, and decision making (especially where relevant information is imprecise, uncertain, incomplete, unreliable, partially inconsistent, or any combination of these). Two areas recommended as having payoff for further work were: (a) The assessment of battalion operations/effectiveness and (b) The design of complex systems.

512,867
AD-A148 638/0/GAR PC **A03/MF A01**
Young (Arthur) and Co., Washington, DC.
Design and Development of a Prototype Organizational Effectiveness Information System.
Final rept. 1980-1984,
U. S. James, P. Marinelli, J. Dunham, W. Hayford, and E. McIntire. Nov 84, 26p ARI-RN-84-131
Contract MDA903-80-C-0147

This report describes the development of a prototype information system for the use of Army Organizational Effectiveness Staff Officers (OESOs) and the Organizational Effectiveness Center and School (OECS). The purpose of the Organizational Effectiveness Information System (OEIS) is to shorten the learning time for the OESO to attain journeyman-level competence after going into the field and to provide information to OECS which will allow that school to assess the impact of its training and make any needed changes to its curriculum. The OEIS consists of the following subsystems: (1) the Implementation and Design System, which is a database of information about past and ongoing OE operations; (2) the Survey System which allows the OESO to design questionnaires, process them automatically, and obtain summaries of the results; and (3) the Resource System which is an automated library of available OE resources (people, written references, and events). A Command Summary System, originally envisioned as part of the OEIS, was dropped as a requirement for the prototype. The OEIS prototype is implemented in a mainframe IBM environment using FOCUS, a non-procedural database management system. This approach was chosen over traditional system programming languages to shorten development time and to provide for flexible system enhancement and maintenance. The utility of the OEIS remains to be fully tested.

512,868
AD-A148 639/8/GAR PC **A05/MF A01**
Interamerica Research Associates, Inc., Rosslyn, VA.
Teacher's Guide for Using Learning Strategies in English-as-a-Second-Language Instruction.
Contractor rept. Feb 82-Sep 84,
G. Stewner-Manzanares, A. U. Chamot, J. M. O'Malley, L. Kupper, and R. P. Russo. Nov 84, 80p ARI-RN-84-134
Contract MDA903-82-C-0169

This guide is a product of the research component of the Basic Skills Resource Center. The research component involves the implementation of the learning strategies research agenda which includes a research study that focuses on learner strategies used in the acquisition of English as a second language (ESL). The Teacher's Guide demonstrates for ESL teachers how learning strategy instruction can be integrated into a ESL curriculum. Descriptions of learning strategies are provided as well as example lessons that can be used in teaching ESL. (Author)

512,869
AD-A148 640/6/GAR PC **A09/MF A01**
Young (Arthur) and Co., Washington, DC.
Analysis of the Impact of the U.S. Army Program of Organizational Effectiveness.
Final rept. 1980-1982,
U. S. James, M. D. McCorcle, A. J. Brothers, and L. W. Oliver. Nov 84, 199p ARI-RN-84-130
Contract MDA903-80-C-0147

This report describes research conducted to assess the impact of the Army's Organizational Effectiveness (OE) program on the Army. The researchers interviewed Users (Commanders), OE Consultants, and others who had participated in 35 selected OE operations. Results indicated that the most successful operations are those interfacing interpersonal or intergroup processes with technological processes or issues but which do not require outside resources or support. True macro-level operations are very difficult to implement successfully. The key role in an OE operation is that of an actively involved leader. Structuring (clarifying outcomes and organizing change strategies) and diffusion (circulating information throughout the system and obtaining feedback) are processes important to the success of an operation. The OE consultant is important in coaching the User in desirable behaviors and in actively participating in the diffusion process. It was not possible, in the time available at each installation, to obtain reliable data on costs and benefits of OE operation. Implications of the findings for leader development and OE consultant training are discussed. (Author)

512,870
AD-A148 642/2/GAR PC **A15/MF A01**
General Research Corp., McLean, VA.
Manpower and Personnel Requirements Determination Methodologies (MANPERS).
Interim rept. 15 May-15 Nov 82,
C. M. Knerr, E. E. Miller, L. B. Nadler, S. K. Dowell, and F. O. Deppner. Dec 84, 342p GRC-1299-01-82-CR, ARI-RN-84-136
Contract MDA903-82-C-0269

This Phase I report covers initial research into manpower and personnel requirements determination processes used by other services. It also covers information gleaned from subject matter experts who are employed by the Army Materiel and Combat Developer. This report includes a statement of requirements for developing an ideal baseline to generate Army manpower and personnel requirements. To support the requirements determination process, an MOS and related task oriented taxonomy was developed along with algorithms and procedures for use in developing the qualitative and quantitative personnel requirements information associated with new weapon systems development. Originator-supplied keywords include: Behavioral, task descriptive data, task and skill analysis, documentation of requirements, Basis of Issue Plan, force structure, combat developer, materiel developer, trainer, integrated logistics support, logistics support analysis, and life cycle system management model.

512,871
AD-A148 668/7/GAR PC **A06/MF A01**
Naval Postgraduate School, Monterey, CA.
Excellence in the Surface Navy.
Master's thesis,
G. G. Gullickson, and R. D. Chenette. Jun 84, 122p

Excellence in the Surface Navy is examined, first by interviewing twenty one senior naval officers and then by going aboard six ships identified by the senior officers as being the embodiment of excellence. Chapters 1 through 4 is a summary of the indicators of excellence on which the senior officers focused. Such topics as awards, ship cleanliness, and operational performance are discussed. Chapter 5 summarizes the views of these senior officers on the means used to achieve excellence. From the shipboard interviews, it is concluded that the excellent ships possess a common set of attributes that account for their excellence. The attributes are: good ships getting better; pride in evidence at all levels; teamwork, not just a concept but a way of life; the ship in automatic; high energy level/bias towards action; presence of a common vision and shared values; as the captain, so is the ship; sailors, our most important resource; and oh yes, task accomplishment. These attributes are discussed in Chapter 6 through 15. Recommendations are made for expanding analysis of excellence in the Surface Navy and other naval communities. (Author)

512,872
AD-A148 681/0/GAR PC **A06/MF A01**
Yale Univ., New Haven, CT. School of Organization and Management.
Life Cycles of Ad Hoc Task Groups.
Interim rept.,
C. J. G. Gersick. Oct 83, 114p Rept no. TR-4
Contract N00014-80-C-0555

This report covers the first of two successive studies. The main features of the life cycle model developed in this study are tested and refined in the second. Which provides a focussed analysis of four groups. One tool frequently used to accomplish work in organizations is the ad hoc team--a group brought together specifically to do a particular project in a limited time period. Such teams must manage several demands simultaneously. In addition to generating the group product, team members must find appropriate ways to work together, deal with the expectations of people outside the team (e.g. supervisors, clients, constituencies), and attend to deadlines. This research uses case histories of four naturally-occurring groups to examine how a group deals with its multiple agendas through its lifespan. Analysis revealed cyclical patterns in teams' task progress, in their attention to outsiders, and in members' interpersonal work relations. Although different teams handled these issues differently, and moved through the cycles at different speeds, they showed striking convergence in the way they alternated between periods of continuity and periods of change, and in the timing of major transitions. Implications are drawn for diagnosing and managing the problems ad hoc teams commonly encounter, particularly regarding movement through group work, equity among members, and contact between a team and its supervisor.

512,873
AD-A148 740/4/GAR PC **A02/MF A01**
General Accounting Office, Washington, DC. Human Resources Div.
Review of the U.S. Army's Use of Volunteers in Research Experiments.
6 Nov 84, 7p Rept no. GAO/HRD-85-17

No abstract available.

512,874
AD-A148 749/5/GAR PC **A05/MF A01**
Naval Postgraduate School, Monterey, CA.
Ship Readiness and Personnel Attributes in (DD 963) Spruance Class Ships.
Master's thesis,
J. R. Crane. Jun 84, 95p

This thesis analyzes the relationship between ship readiness and the personnel attributes of the personnel assigned to seventeen Spruance Class destroyers. Equipment history as defined in the Consolidated Casualty Reporting (CASREP) system is used as a proxy of ship history. Older, more experienced, and higher-quality personnel assigned in the correct numbers are hypothesized to effect higher ship readiness (lower equipment casualties and lower associated equipment down time). Results from the analysis generally tend to support the hypothesis. However, as with previous analysis, the amount of variation attributable to personnel differences appears to be small when compared to the differences attributable to ship and command differences. Examining ship readiness with respect to the CASREP system does not produce strong enough personnel relationships in which to base future strategic planning, suggesting that other avenues should be examined. Originator-supplied keywords include: Material Readiness, Personnel Characteristics, Ship Manning, Crew Turbulence, and Ship Employment Effects on Readiness.

512,875
AD-A148 807/1/GAR PC **A09/MF A01**
Office of the Secretary of Defense, Washington, DC.
Fiscal Year 1983 Readiness Assessment of the Reserve Components.
1983, 180p

The purpose of this FY 1983 Readiness Assessment is threefold: 1) To present the Board's evaluation of the readiness condition of the Reserve Components in FY 1983. 2) To note significant progress or shortfalls in readiness since previous Board assessments. 3) To make recommendations for improving future Reserve Component readiness. Costs manpower and equipment are statistically analyzed. This year's report has been expanded by adding two new sections: a chapter on Medical Readiness and a chapter on Full-Time Support to the Reserve Components.

512,876
AD-P004 309/1/GAR PC **A02/MF A01**
Fighter Weapons School, Nellis AFB, NV.
Using a Limited Field of View Simulator to Instruct High Speed, Low Altitude Flying Skills,
M. Miller. Sep 84, 14p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p7-20.

This paper describes the use of an A-7 Vital IV (three screen) visual simulator in a low altitude training program. This program is the first to use such a simulator in the training of tactical fighter pilots to operate in the low altitude environment. The program is part of the syllabus used in the Air National Guard, Fighter Weapons School program for highly experience A-7D pilots. The Low Altitude Training portion of this syllabus consists of 12 hours of academic instruction, a one hour simulator and a two phase flying program of at least two aircraft sorties. This paper discusses the simulator profile, explains each task, how it is accomplished and provides a subjective evaluation of its effectiveness. The paper identifies the training limitations imposed by such a low fidelity visual system, recommends several additional uses within the existing capability of the simulator, and identifies several minimum criteria for any 'full mission simulator'. (Author)

512,877
AD-P004 310/9/GAR PC **A02/MF A01**
Dayton Univ., OH. Research Inst.
Visual Perceptual Aspects of Low Level High Speed Flight and Flight Simulation,
R. S. Kellogg, and M. Miller. Sep 84, 16p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p21-36.

The low level high speed flight arena has opened up as a very important one in the past several years. Weapon systems and tactics developments have forced the acquisition of pilot skills in low level, high speed flight. In order to remain undetected and complete his mission, the pilot is forced to fly below enemy radar. This carries with it the constant threat of contact with the ground, which is of course as lethal as enemy missiles. As a consequence of this necessity to fly low and fast, a thorough going training program has been under development for the past three years at the 162nd Fighter Weapons School, USAFR, Tucson, Arizona, in collaboration with the Human Resources Laboratory, Williams AFB, Arizona. The purpose of the present paper is to describe in some detail the visual/perceptual aspects of low level, high speed flight as they are currently viewed by the developers of this program. The flighter simulator has already begun to play an important role in this training program, and this role will certainly expand with the fast developing simulator technology in conjunction with better understanding of the training requirements.

512,878
AD-P004 311/7/GAR PC **A02/MF A01**
Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, OH.
Altitude Control Using Action-Demanding Interactive Displays: Toward an Active Psychophysics,
R. Warren, and G. R. McMillan. Sep 84, 15p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p37-51.

Ecological approaches to perception and action emphasize the importance of exploration and manipulation for obtaining useful information. This seems to apply to the demanding task of low altitude flight. However, the ecological approach currently uses the same passive methods used in traditional psychophysics: Observers may only respond to a display in a manner which does not affect the display (e.g., yes/no or scaling judgments). Observers generally cannot manipulate the display to provide information which they -- and not the experimenter -- determine. A new methodology which both permits and demands observer action is needed for active performance. This paper outlines the beginnings of an active psychophysics and illustrates the techniques with an experiment designed to evaluate altitude holding in the presence of a gust. Initially, the techniques borrow heavily from those in manual tracking studies. The displays are a joint

function of experimenter chosen initial conditions, observer control inputs, and a continuous gust disturbance. Sum-of-sines forcing functions and human operator describing functions are highlighted. (Author)

512,879
AD-P004 312/5/GAR PC A02/MF A01
LTV Aerospace and Defense Co., Dallas, TX.
Low Altitude High Speed Flight Simulation Using Video Disc Technology,
V. Devarajan, J. T. Hooks, and D. C. McGuire. Sep 84, 13p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p53-65.

The LTV Aerospace and Defense Company's visual technology uses video discs as direct access and storage devices of video data obtained from a series of discrete photographs of the gaming area. Each discrete photograph is electronically scanned, converted to video data, formated and stored on video disc. When needed for display, the data is retrieved from video disc, processed and manipulated to display the correct perspective view of the terrain relative to the position and attitude of the simulated aircraft. The pilot has complete freedom of route and attitude within the gaming area. Extensions to the basic video disc technology are currently under development to provide visual simulation of low level tactical missions. This paper describes the algorithm modifications and hardware/software design issues involved in real time generation of low-level/high-speed scenes. Descriptions are also provided of a non-real time emulation of the concepts and hardware design. (Author)

512,880
AD-P004 313/3/GAR PC A02/MF A01
Tactical Airlift Training Group (34th), Little Rock AFB, AR.
Simulating Speed and Height Cues in the C-130 Weapon System Trainer,
M. J. Sieverding. Sep 84, 9p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p69-77.

The C-130 Weapon System Trainer (WST) at Little Rock AFB, Arkansas is, perhaps, the most realistic full mission simulator in DoD. Much of its realism and training value comes from the ability of its full color, CGI visual system to provide speed and altitude cue while flying low level over a 'real world' visual data base (VDB) of more than 50,000 square nautical miles. The C-130 aircraft is navigated visually while flying at approximately 250 knots and 300 feet above the ground. Visual ground references in the C-130 WST must realistically reflect chart information and provide the visual cues necessary for confident flight above the ground contour. This paper describes various types of speed and height cues and highlights the major attributes of the C-130 WST visual system that give these cues during a typical C-130 WST mission profile. Many internal conclusions and observations are admittedly subjective...based on several years of system use and thousands of hours of flying time...and not confirmed by hard data from the behavioral sciences community. The rate of technological change has far outpaced our ability to quantify its impact on human factors under controlled and statistically sound conditions. Those offices with the authority to procure and apply new simulator technology are quite reasonably hesitant to provide funding without such proof. However, the presumed benefits of using new technology can sometimes outweigh the risk of using that technology without analytic proof of its benefits. Funding actions may at times be the result of intuitive judgment and visceral reaction, but full acceptance and application of new technology requires analytic proof of its impact on human factors.

512,881
AD-P004 314/1/GAR PC A02/MF A01
Grumman Aerospace Corp., Bethpage, NY.
Producing High Scene Content with Perspective Validity,
G. Y. Gardner, and R. S. Rulon. Sep 84, 16p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p79-94.

Maintaining perspective validity in visual displays is essential to providing proper training cues. Perspective validity has many aspects, including correct perspective transformation of geometric shapes, exact determination of surface priority relationships, accurate shading of curved as well as planar surfaces, consistent mapping of texture patterns onto scene surfaces, and proper representation of aerial perspective. This paper describes the mathematical models used in Grumman's non-edge computer image generation CIG technology to maintain perspective validity in all its aspects. (Author)

512,882
AD-P004 315/8/GAR PC A02/MF A01
Defense Mapping Agency Aerospace Center, St. Louis AFS, MO.
Color Visual Simulation Applications at the Defense Mapping Agency,
J. D. Simley. Sep 84, 13p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p95-107.

The Defense Mapping Agency (DMA) produces the Digital Landmass System data base to provide culture and terrain data in support of numerous aircraft simulators. In order to conduct data base and simulation quality control and requirements analysis, DMA has developed the Sensor Image Simulator which can rapidly generate visual and radar static scene digital simulations. The use of color in visual simulation allows the clear portrayal of both landcover and terrain data, whereas the initial black and white capabilities were restricted in this role and thus found limited use. Color visual simulation has many uses in analysis to help determine the applicability of current and prototype data structures to better meet user requirements. Color visual simulation is also significant in quality control since anomalies can be more easily detected in natural appearing forms of the data. The realism and efficiency possible with advanced processing and display technology, along with accurate data, make color visual simulation a highly effective medium in the presentation of geographic information. As a result, digital visual simulation is finding increased potential as a special purpose cartographic product. These applications are discussed and related simulation examples are presented. (Author)

512,883
AD-P004 316/6/GAR PC A02/MF A01
Michigan Univ., Ann Arbor.
Automated and Interactive Data Base Generation,
B. Ohmann, and B. Fowler. Sep 84, 16p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p109-124.

Until the mid 70's, visual simulation had been limited to small areas - primarily airfields and aircraft carriers - and complexity of the data bases was quite restricted due to the limited capacity of the image generators. Today training simulators require realistic terrain and gaming areas encompassing hundreds of thousands of miles, yet need accurate highly detailed 'insets' for nap-of-the-earth flights. This paper will discuss improvements in data base generation technology which have allowed gaming area realism to keep pace with rapid advancement of Image Generator capabilities. (Author)

512,884
AD-P004 317/4/GAR PC A02/MF A01
Evans and Sutherland Computer Corp., Salt Lake City, UT.
Geographic Subdivision and Top Level Data Structures, Columbus, Magellan, and Expanding CIG (Computer Image Generation) Horizons,
L. C. Clark, and M. R. Pafford. Sep 84, 21p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p129-149.

Recent advances in CIG technology have made it possible to accommodate the production of very large map correlate visual data bases of homogeneous feature density. Inherent in the top level design of a visual data base is a strategy for geographic subdivision. This strategy is implemented in a top level data structure which is processed by the CIG hardware to determine which portions of a visual data base to display. The top level data structure also dictates how the visual data base must be modeled. Since a visual data base is typically constructed in a 3D Cartesian coordinate system, the problems historically associated with 'round to flat earth' map projections are also encountered in top level data structures. There are also constraints imposed by the CIG system used. We will review the standard methods of geographic subdivision and discuss their limitations when applied to training requirements. We will explore a new strategy for geographic subdivision of a visual data base utilizing the military UTM and UPS grid systems and the leverage derived from innovative modeling techniques; i.e., semi-automatic generation of terrain DLMS data, and strategies for reusing common scene elements. We will discuss how these concepts are currently being implemented into visual data base design and will show how an extrapolation of these trends can be applied to the problem of 'whole earth' navigation training.

512,885
AD-P004 318/2/GAR PC A02/MF A01
Evans and Sutherland Computer Corp., Salt Lake City, UT.
CIG (Computer Image Generation) Data Bases in an Instance: Bits and Pieces,
J. L. Costenbader. Sep 84, 13p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p151-163.

Strategies may be developed to reuse bits and pieces of CIG data base models and map them throughout the data base to create a one to one real world correspondence. The net effect is that data base development costs are reduced and the amount of required on-line data storage is decreased. Further, scene densities may be increased to take full advantage of image generator capabilities and are not degraded by lack of on-line storage availability. This notion implies that there exists a library of CIG models of standard cultural features that may be mapped or 'instanced' throughout the geographic region. Further, the geographic region itself is a terrain model made up of instanced pieces derived from the Digital Landmass System (DLMS) data base, Digital Terrain Elevation Data (DTED). Another implication is that the image generator (IG) is capable of run time replication of these models throughout the data base. This concept of a library of cultural features ties closely to data provided by the Defense Mapping Agency (DMA) in the (DLMS) data base, 2nd Edition as well as the prototype specification to support High Resolution/Terrain Analysis Applications. This paper will show methods used to develop a collection of 'Bits and Pieces' of real world cultural features and how to use information from DMA data tapes to map these features onto the terrain. The nature of the IG hardware used to achieve these results will also be discussed.

512,886
AD-P004 319/0/GAR PC A02/MF A01
General Dynamics Corp., St. Louis, MO.
Generation of Three-Dimensional Data Bases Using a Building Block Approach,
D. D. Smart, R. D. Teichgraeber, and A. C. Chirieleison. Sep 84, 12p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p165-176.

Simulation system visual data base designs must provide engineers and test pilots with adequate realism in mission scenarios to insure acceptable results without the luxury of long design schedules. The objective is to build large three-dimensional data bases quickly and efficiently, while generally matching terrain and landscape features. The BUILDING BLOCK approach is presented as a means to achieve this objective. An example is presented to illustrate this approach. (Author)

512,887
AD-P004 320/8/GAR PC A02/MF A01
Societe Anonyme d'Etudes et Realisations Nucleaires, Limeil-Brevannes (France).
SODERN Visualization System (SVS) for Flight Simulation,
F. X. Doittau, J. R. Huriet, and M. Tissot. Sep 84, 11p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p193-203.

The Titus light valve is actually a two-dimension analogical memory which is electronically controlled. It is well adapted to flight simulation requirements because it supplies high resolution, high brightness, flicker-free images. The SVS (SODERN Visualization System) uses three Titus light valves to project full color images at 30 Hz rate. Already developed models supply good

quality images; further improvements are foreseen in near future, especially for geometrical resolution.

512,888

AD-P004 321/6/GAR PC A02/MF A01
Essex Corp., Alexandria, Va.
Overview of the Research Program at the Visual Technology Research Simulator,
G. Lintern, D. C. Wightman, and D. P. Westra. Sep 84, 17p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p205-221.

The behavioral research program at the Visual Technology Research Simulator is in its sixth year. Although research has emphasized visual issues in simulator training of flight skills, other hardware and instructional technology issues have been explored. This paper outlines significant features of the program's research plan and summarizes the major results.

512,889

AD-P004 322/4/GAR PC A02/MF A01
Rediffusion Simulation, Inc., Arlington, VA.
Use of Lasers in Wide-Angle Visual Systems,
B. Barber. Sep 84, 15p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p223-237.

Performance requirements and associated problems of wide-angled displays are discussed, and possible solutions based on the use of lasers outlined. Included, is a helmet-mounted projector system currently being built for the Naval Training Equipment Centre. (Author)

512,890

AD-P004 323/2/GAR PC A02/MF A01
Air Force Human Resources Lab., Williams AFB, AZ.
Considerations in an Optical Variable Acuity Display System,
R. B. Bunker, and R. Fisher. Sep 84, 13p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p239-251.

This paper describes an effort to establish feasibility and quantify parameters of a truly optimal simulator visual system, i.e., one that fully satisfies human visual requirements with an absolute minimum of processing and display equipment. The concept is described and compared to alternate approaches with respect to size and complexity. The current effort to define parameters required to minimize potential operator distractions is described and results to date are presented. (Author)

512,891

AD-P004 324/0/GAR PC A02/MF A01
General Electric Co., Daytona Beach, FL.
Design Considerations for an Eye Tracked AOI (Area of Interest) Display System,
F. B. Neves. Sep 84, 12p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p255-266.

The potential benefits of using an Area of Interest (AOI) display for high performance out-the-window visual simulation is evidenced by the current activity in this display technology. The AOI concept can be implemented in many versions. In each AOI display type a complex tradeoff of performance parameters must be considered. A review of these considerations will be discussed in this paper concentrating upon the display versus the CIG. The display being developed for the Visual System Component Development Program (VSCDP) by the General Electric Company (GE) is an AOI display concept. The major features of the display system and the current status of the display development will be discussed. (Author)

512,892

AD-P004 325/7/GAR PC A02/MF A01
General Electric Co., Daytona Beach, FL. Simulation and Control Systems Dept.
Control Systems Analysis Program: A Tool for Analysis of the GE-VSCDP (General Electric-Visual System Component Display Program) Image Display System,
C. Chi, and E. Pollak. Sep 84, 12p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p267-278.

CSAP is a simulation program used to analyze the performance of the GE-VSCDP image display system. It has been used to define some unknowns and to analyze the AOI/BG image's shear effect and dynamic distortion due to finite servo velocity. Of major importance, it is used to optimize the image display system to minimize the displacement error between the center of CIG image and the center and the servo projector. (Author)

512,893

AD-P004 326/5/GAR PC A02/MF A01
Singer Co., Silver Spring, MD. Link Simulation Systems Div.
Progress Report on an Eye-Slaved Area-of-Interest Visual Display,
H. M. Tong, and R. A. Fisher. Sep 84, 16p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p279-294.

A dome-projection real-image system based on an eye-slaved area-of-interest (AOI) concept has been under development for some time at the Link Flight Simulation Division of The Singer Company. The Link approach provides a high-resolution area set within a wide-field-of-view background. The display image is presented to the trainee using light valve projection on a dome screen, with the high-resolution AOI inset slaved to the trainee's eye line of sight. The display development program at Link has progressed past the system integration phase and is undergoing proof-of-concept test and evaluation. The system approach and preliminary test findings are discussed in this paper. (Author)

512,894

AD-P004 327/3/GAR PC A02/MF A01
Rediffusion Simulation, Inc., Arlington, VA.
Air Combat Visual Simulation Using a Head Slaved Projector,
P. M. Murray, G. J. Olive, M. E. Roberts, and O. Wynn. Sep 84, 17p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p295-311.

An experimental system is described which is aimed at providing a low cost air combat training capability by the use of a head coupled projector giving a wide angle display with a high resolution central region and a low resolution peripheral region. (Author)

512,895

AD-P004 328/1/GAR PC A02/MF A01
KFO Associates, Inc., Wyckoff, NJ.
Second Generation WAVIDS (Wide Angle Virtual Image Display System),
A. Cox, and W. V. Dykes. Sep 84, 15p
Contract N61339-83-C-0096
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p315-329.

A second generation WAVIDS (Wide Angle Virtual Image Display System) has been designed using Fresnel lenses. The instantaneous field of view is 75 degrees, and the total field of view is 90 degrees, with an eye-clearance of 38.0 inches. The correction of spherical aberration, coma and astigmatism leads to a design with 30% negative distortion. An auxiliary optical system has, therefore, been designed which takes an undistorted image and introduces a compensating 30% distortion. As a result an undistorted image is viewed through the WAVIDS.

512,896

AD-P004 329/9/GAR PC A02/MF A01
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Effects of Time Delay in Man-Machine Control Systems: Implications for Design of Flight Simulator Visual-Display-Delay Compensation,
D. F. Crane. Sep 84, 13p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p331-343.

When human operators are performing precision tracking tasks, their dynamic response can often be modeled by quasi-linear describing functions. That fact permits analysis of the effects of delay in certain man-machine control systems using linear control system analysis techniques. The analysis indicates that a reduction in system stability is the immediate effect of additional control system delay, and that system characteristics moderate or exaggerate the importance of the delay. A selection of data (simulator and flight test) consistent with the analysis is reviewed. Flight simulator visual-display-delay compensation, designed to restore pilot-aircraft system stability, was evaluated in several studies which are reviewed here. The studies range from single-axis, tracking-task experiments (with sufficient subjects and trials to establish the statistical significance of the results) to a brief evaluation of compensation of a computer-generated-imagery (CGI) visual display system in a full six-degree-of-freedom simulation. The compensation was effective -- improvements in pilot performance and workload or aircraft handling-qualities rating (HQR) were observed. Results from recent aircraft handling-qualities research literature, which support the compensation design approach, are also reviewed. (Author)

512,897

AD-P004 330/7/GAR PC A02/MF A01
CAE Electronics Ltd., Montreal (Quebec).
Fiber-Optic Helmet-Mounted Display,
B. Welch, and M. Shenker. Sep 84, 17p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p345-361.

The feasibility of the Fiber-Optic Helmet-Mounted Display (FOHMD) concept has been demonstrated on a breadboard system installed on a simulator at the Air Force Human Resources Laboratory (AFHRL). Behavioral and engineering evaluation are currently being conducted to determine the optimum design specification for an Engineering Prototype scheduled for completion in late 1984. This paper describes the significant engineering aspects of the FOHMD together with the exploratory program for improving its performance. (Author)

512,898

AD-P004 331/5/GAR PC A02/MF A01
CAE Electronics Ltd., Montreal (Quebec).
Binocular Overlap in a Fiber Optic Helmet Mounted Display,
R. Kruk, and T. M. Longridge. Sep 84, 16p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p363-378.

Target detection, motion detection, and flight performance were compared under conditions of 25 and 45 binocular overlap using only the low resolution background channels of a Fiber Optic Helmet Mounted Display (FOHMD). In experiments 1 and 2, eight experienced fighter pilots viewed aircraft targets which either approached ownship or moved vertically in the field of view, respectively, at various angles of off axis eccentricity. As an additional task, pilots flew the system as an air combat simulator and were required to track, engage, and destroy an airborne target. The results indicated target and motion detection and binocularly displayed targets were superior to that of monocularly displayed targets. There was no significant difference in target detection or motion detection between the two overlap conditions, per se, nor between left and right fields of view. In both overlap conditions, performance was degraded within 5 of the lateral edges of the field of view, and suppression was evident in contralateral fields in the areas of optical frame overlap. However, the latter effects were combined nearer the central viewing area for the 25 deg overlap condition. No significant differences were noted in the supplementary air combat task as a function of overlap, but structured debriefing data indicated loss of target imagery was less of a problem with the larger overlap. It was concluded that greater than 25 deg binocular overlap should be utilized in follow-on systems. (Author)

512,899

AD-P004 332/3/GAR PC A02/MF A01
Boeing Military Airplane Co., Wichita, KS.

Baffled Eye and Confounded Brain or Using Visual Illusions to Train Blind Pilots,
R. E. Clapp. Sep 84, 14p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p391-404.

The extremely simplified and stylized scene construction in current computer image generation technology, together with scene dynamics shortcomings present display technology with a grossly inadequate real world simulation (one that can be truly called illusionary). Nor is current display technology in better shape. Due to confusion existing within the simulation industry over resolution of the displays, visual systems are underspecified or underdesigned by a factor of about 4 times. This is in addition to low brightness and contrast of saturated colors. If the pilot saw in the real world what he sees in the simulator he would be legally blind. These factors are discussed in some detail and possible improvements are suggested. (Author)

512,900
AD-P004 333/1/GAR PC A02/MF A01
Ohio State Univ., Columbus.
Global Optical Metrics for Self-Motion Perception,
D. H. Owen, L. Wolpert, L. J. Hettinger, and R. Warren. Sep 84, 11p
Contract F33615-83-K-0038
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p405-415.

During locomotion, the entire optic array along the path of travel is continuously transformed. The nature of the transformations is informative about changes in altitude, speed, and imminence of contact with environmental surfaces. Some global optic-array variables are self scaled and some are environment scaled. By unlinking the two types of variables we have been able to empirically assess their relative usefulness for detecting change in altitude and speed. Determining the perceptual effectiveness of optical sources of information also tells us what the functional metrics are for detecting and guiding self motion. (Author)

512,901
AD-P004 334/9/GAR PC A02/MF A01
Naval Training Equipment Center, Orlando, FL.
Simulator Sickness: Sensorimotor Disturbances Induced in Flight Simulators,
L. H. Frank, R. S. Kennedy, M. E. McCauley, R. W. Root, and R. S. Kellogg. Sep 84, 10p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p417-426.

If sickness occurs in the simulator, but not in the real world, there is evidence of a bad simulation. We reviewed the available data on simulator sickness in terms of their incidence, etiology, and contributing factors. It was found that psychophysiological disturbances can occur during simulator flight, continue several hours post-flight, or be delayed. Effects were found in both motion-base and fixed-base simulators, to pilots, other aircrew, and instructors. Simulator sickness may lead to decreased simulator use, distrust of the training received, and post-effects which may place the individual at risk in real-life situations such as driving a car. Adaptation, while it is known to occur, is not the answer. Adaptation to the simulator can lead to acquisition of responses which may produce negative transfer to the aircraft. Data on the relative incidence of simulator sickness in various trainers, its symptomatology, possible etiology, possible solutions and suggestions for research are discussed. (Author)

512,902
AD-P004 335/8/GAR PC A02/MF A01
Naval Training Equipment Center, Orlando, FL.
On-Board Computer Image Generator (CIG) Applications,
D. R. Breglia, and D. B. Coblitz. Sep 84, 7p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p431-437.

Current training of military pilots fails to provide the complex visual environment associated with expected combat conditions. In addition, the training systems which provide the highest fidelity to combat are not available often enough to all pilots who require maintenance of volatile combat skills. On-board visual simulation using computer image generation is a technology which is ripe for exploitation for training. Training scenarios and development implications of on-board visual simulation are discussed. (Author)

512,903
AD-P004 336/4/GAR PC A02/MF A01
Rediffusion Simulation, Inc., Arlington, VA.
CIG (Computer Image Generator) Goes to War: The Tactical Illusion,
J. B. Howie, and M. A. Cosman. Sep 84, 16p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p439-454.

Simulation can play a decisive role in preparing pilots to survive and prevail in such a situation; however, realistic simulation of a complex multi-threat tactical environment has remained an elusive goal of computer generated imagery. Current systems have been unable to present both the quantity and quality of visual cues required to train effectively in all phases of the tactical combat experience. Recent advances in CIG technology have created a system which reaches new levels of realism and effectiveness in such a task. The CT5A system can provide a dense, navigationally specific terrain model of large geographic extent, while providing a substantial reserve of processing capability which can be used to present a rich dynamic environment. Within this environment a number of ground and airborne tactical threats can be simultaneously active. Unique features within the CT5A system allow the orchestration of complex tactical effects such as missiles, cannon, tracers, flak and bomb impacts. Special modeling, shading and coloration strategies allow the presentation of very high fidelity aircraft models to support midair refueling, formation flight and target acquisition/recognition. Many dynamic scene elements can be simultaneously active in both independent and chained motions, with proper occulting and realistic behaviour maintained. We will discuss the various features of the CT5A system which make such simulations possible, and will present dynamic visual examples of these and other tactical scenarios.

512,904
AD-P004 337/2/GAR PC A02/MF A01
Singer Co., Lancing (England). Link-Miles Div.
Military Applications of the Singer Link-Miles IMAGE Visual System,
D. H. Geere, and T. Crampin. Sep 84, 20p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p455-474.

This report has discussed the evolution of the IMAGE system both from technological and Human Factors standpoints. The results of this approach have been to attempt optimum matching of available technologies to meet training requirements. In systems terms it is appropriate to consider the user as the LIVEWARE. Hence the ideal system is an appropriate blend of hardware, software and liveware.

512,905
AD-P004 338/0/GAR PC A02/MF A01
General Electric Co., Daytona Beach, FL.
AVTS (Advanced Visual Technology System): A High Fidelity Visual Simulator,
R. L. Ferguson. Sep 84, 12p
This article is from 'The IMAGE III Conference Proceedings Held at Phoenix, Arizona on 30 May - 1 June 1984,' AD-A148 636, p475-486.

The Advanced Visual Technology System (AVTS) was developed under the auspices of the Air Force Human Resources Laboratory (AFHRL) to satisfy the demanding TACAIR mission visual system requirements. In particular, the requirement for low level flight through a high density, wide FOV, rolling terrain environment with a large number of moving models on and above the terrain surface posed a formidable system design problem. New developments were required in the critical areas of VDB structure, feature selection, priority, load management and blending to achieve the requisite scene content. This paper will discuss the advancements made in these areas, and show that an integrated system design process was essential to the success of the project. (Author)

512,906
ED-246 838 Not available NTIS
Southwest Educational Development Lab., Austin, TX.
Effectiveness of Microcomputers in Education: A Quick Guide to the Research,
F. D. Ploeger. Sep 83, 50p
Contract 400-83-0007
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Based on a preliminary examination of over 1,200 article titles and abstracts and a subsequent review of selected articles, this booklet presents in highly abbreviated tabular format the most important research in the field of instructional microcomputing, including both computer assisted and computer managed instruction in elementary, secondary, and postsecondary education. It is noted that a more detailed synthesis of the research has also been published (IR 011 208). Research topics covered in the booklet include computer literacy and the use of microcomputers in general learning and for instruction in mathematics, music, reading, science, and typing. For each of the 22 studies listed, information is provided on authors, date of publication, topic, population studied, methodology, and outcomes. A survey by Henry Jay Becker, concerned with the distribution of microcomputers in schools in the United States, is described in more detail and information is quoted directly from the Becker study on the typical micro-owning elementary and secondary school. It is concluded that instructional microcomputing has been demonstrated to be a valuable educational tool and most effective as an adjunct to traditional instructional tactics. Also provided are bibliographic citations for each of the research studies tabulated and lists of the advisory board members and regional exchange staff of the Southwest Educational Development Laboratory. (ESR).

512,907
ED-246 839 Not available NTIS
City Univ. of New York. Office of Academic Affairs.
Microcomputers and Basic Skills in College: Applications in Reading, Writing, English as a Second Language, and Mathematics,
G. Akst. 1984, 102p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

An outgrowth of a conference of developmental faculty and administrators interested in exploring computer-based education, this monograph presents 26 papers devoted to microcomputer applications in college basic skills programs. Included are 5 papers on general topics, 13 on language teaching, 7 on mathematics, and 1 dissent paper. Articles range from broad overviews of the issues and options in this field to research papers and papers focusing on specific software packages. Additional papers explore the use of the word processor for teaching writing, discuss the steps faculty need to take in order to develop their own software or experience in adapting software written by others, and describe curricular models of pairing courses to improve instruction. Two major articles look to the future of the new technology and discuss how the computer may change teaching methods. Specific topics addressed include computerized testing in college basic skills instruction, sentence logic, teaching sentence structure by microcomputer, the potential of computer assisted-instruction in college reading programs, English as a second language (ESL) computer-assisted research and computer-assisted instruction, and relearning mathematics through LOGO. A glossary of technical terms is included. (LMM).

512,908
ED-246 841 Not available NTIS
Alberta Dept. of Education, Edmonton.
Evaluator's Guide for Word Processing Software.
1984, 57p
Developed by Alberta Education (Computer Technology Project).
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This guide provides a detailed evaluation form, together with complete instructions for using it, which is designed to elicit answers to the following questions: (1) What features and abilities does a specific word processing program have, (2) On which computer(s) will the program work, (3) Is additional hardware/software necessary before the program can be implemented, (4) How easy is it to learn and to use the program, (5) How efficient is the program, (6) Is the program sup-

ported with good documentation, such as user manuals, tutorials, and quick reference helps, and (7) What are the major strengths and weaknesses of the program. Focus is on three major components of a typical word processor: an editor, a file manager, and a formatter. For each component, users are asked to indicate presence or absence of certain features, to amplify their yes/no responses, and to describe existing features of the program in detail. Users are then asked to evaluate each function, including findings about the ease/complexity of use, and the merits of the particular function. Finally, space is provided for an overall assessment of the program and a recommendation regarding its implementation. (LMM).

512,909
ED-246 842 Not available NTIS
Hampshire Educational Collaborative, Northampton, MA.
Helping Teachers Become Computer Literate: A BASIC Approach. Third Edition, Inservice Series No. 7,
M. A. B. Wilson. 1983, 78p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Designed as a teaching script to introduce adults to computer operation and programming, this manual can also be used for self-instruction on Apple II or Apple IIe computers. BASIC programming language is used in the following lessons: (1) 'Running the Machine, Print Command'; (2) 'Giving the Computer Information'; (3) 'When the Computer Gets Information in a Bunch or Creates Its Own Information'; (4) 'Loops and Graphics'; (5) 'Random Numbers and High Resolution Graphics'; (6) 'Subroutines and Things That Go Peep in the Night'; (7) 'Two Dimensional Arrays, Fooling Around with String Variables'; and (8) 'Files, Hexidecimals, and Flowcharting.' The lessons teach BASIC commands, vocabulary, and programming procedures. Assignments and quizzes are included. (LMM).

512,910
ED-246 843 Not available NTIS
International Visual Literacy Association, Bloomington, IN.
Visual Literacy--Enhancing Human Potential. Readings from the 15th Annual Conference of the International Visual Literacy Association,
A. D. Walker. 1984, 425p
Proceedings of the Annual Conference of the International Visual Literacy Association (15th, Bloomington, IN, November 1983). For related document, see ED 228 980.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This document includes 46 papers presented at the International Visual Literacy Association Conference on topics ranging from prehistoric cave paintings to technology of the future. Major sections are devoted to research and theory, education, computer technology, and phototherapy. Emphasis is on increased understanding of opportunities available for using visual literacy to equip people to deal more effectively with today's problems. Specific topics addressed include an analysis of visual recruitment materials used in higher education; picture legibility, readability, and reading value; visual literacy and cognitive style; assessing field dependency with theatrical slides; helping children to apply a conceptual model to photography; learning from television; mental imagery and participatory instructional design; the effect of visualization as an aid in teaching grammatical concepts in German; cameras in the curriculum; visual/spatial strategies for writing and reading improvement; a whole brain approach to creative problem solving; the potential of computerized multi-image production; creative visualization with microcomputers; visual technology and the development of active visual learning; and the creative elderly. (LMM).

512,911
ED-246 844 Not available NTIS
Alberta Dept. of Education, Edmonton.
Computer Courseware Evaluations. A Series of Reports Compiled by the Clearinghouse Computer Technology Project.
Oct 83, 108p
Microdot printing in colored ink on colored pages may not reproduce well.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This report reviews Apple computer courseware in business education, library skills, mathematics, science, special education, and word processing based on the curricular requirements of Alberta, Canada. It provides detailed evaluations of 23 authorized titles in business education (2), mathematics (20), and science (1); 3 of the math titles are also evaluated for use in special education. Titles not recommended or still to be evaluated are listed for all six areas. The detailed evaluations include the disk title, producer(s), address, telephone number, grade level, contents, topics, additional hardware/software requirements, other formats available (not evaluated), year produced, cost, subject, and format. Also included are objectives, content description, content evaluation, instructional format description and evaluation, technical design description and evaluation, management system description and evaluation, a summary statement, status (recommended or supplementary), and purchase information. Titles include Typing Tutor II; Automated Accounting; Computer Graphing Experiments (volumes 1-3); Academic Skill Builders in Mathematics (Alien Addition, Minus Mission, Meteor Multipication, Demolition Division, Alligator Mix, Dragon Mix); Math Drill; Count and Add; Counting Bee; Math Activities Courseware 6; Laser Chaser; Gertrude's Puzzles; Gertrude's Secrets; Math Skill Games; Elementary Volume 1; Equations; Multiplying Fractions; Quadratic Equations; Math Sequences; Galaxy Math Facts; Mathematics (Levels A-C, Managed); Explorer Metros; Fractions/Decimals; Whole Numbers; and Compete (botany). (LMM).

512,912
ED-246 845 Not available NTIS
WICAT, Inc., Orem, UT.
Computers in Elementary and Secondary Education,
D. H. Heuston. Apr 83, 47p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Some emerging patterns in educational computing permit speculation about future trends in educational computer hardware, software, and applications. Ultimately, three types of hardware units will be used by schools: professional systems, personal computers (microcomputers), and a new generation of inexpensive personal computers that can be attached to color television sets or to their own small screens. Courseware development has been hampered by high costs and the tendency of developers to write small bits of curriculum to fit the limited potential of small systems. Significant courseware may be developed by new types of corporations with the ability to build specialized systems and to hire educational specialists to write materials. Software important to successful educational computing also includes the operating system, authoring systems, computer languages, and administrative software. Current successful educational uses of the computer include programs involving computer managed instruction, drill and practice, the concept of helps, direct instruction, cognitive diagnosis, the use of games, simulations, learner profiles, computers as a teaching language, computer literacy programs, writing and word processing programs, and administrative programs. The ultimate instructional device, however, will result from connecting a videodisc player with one of the powerful new microcomputers. (LMM).

512,913
ED-246 847 Not available NTIS
Communicating Research Findings to Television's Creative Community: Public Policy and the Impact of Educational Television,
B. Watkins. Apr 84, 20p
Paper presented at the Annual Meeting of the American Educational Research Association (68th, New Orleans, LA, April 23-27, 1984). Research was funded by the Bush Foundation, through a grant administered by the Department of Psychology, University of Michigan.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

An ongoing project has been established to (1) summarize and disseminate results of research on children and television to the creative community responsible for commercial and educational children's television, and (2) defuse the issues that have created a rift between this community and the academic community. The research efforts discussed in the two volumes of the National Institute of Mental Health (NIMH) update on Television and Human Behavior (1983) are currently being summarized and condensed into a 20-page document designed for the creative community. An assessment of the need for such materials indicates that a very small proportion of academic television research is useful, or at least perceived as useful, to the creative community, although much curiosity exists for relevant research. Six areas of research useful to both academics and the creators of children's television have been identified to guide selection of research reports from the NIMH update: (1) how children learn television's positive messages, (2) what television features are most attractive to children and maintain their interest and attention, (3) what children understand about television people and events, (4) how television is related to children's other intellectual skills, (5) how children might be taught to use and view television wisely, and (6) how television might be used effectively to promote widespread education on social issues. Tables provide summaries of research findings on attention, age-related changes in comprehension, and learning prosocial behavior from television. Twelve references are listed. (LMM).

512,914
ED-246 848 Not available NTIS
Quality Education Data, Inc., Denver, CO.
Microcomputer Usage in Schools, 1983-84.
1984, 18p
The survey shown in this booklet represents the Third Annual Presentation of Quality Education Data, Inc. (QED) data to the Materials Council of the National AudioVisual Association. For related document, see ED 226 717.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Results are presented for the third annual survey of all United States school districts by Quality Education Data, Inc. Findings are displayed in tabular form, and include information on the following: size of the microcomputer marketplace and the kinds of people involved; availability of software by brand for home, business, and education use; the best home education software sellers; availability of software by brand for educational use; growth patterns; microcomputer use by brand name; hardware manufacturer market penetration; shifts in the use of different brands of microcomputers; the kinds of districts that have microcomputers; the relationship of the relative wealth/poverty of the community to microcomputers; the relationship of instructional dollars per pupil to the presence of microcomputers; the kinds of schools using microcomputers; the relationship of the percentage of minority students to the presence of microcomputers; the validity of enrollment or expenditure as a predictor of presence of microcomputers; computer owners more likely to purchase software; the number of microcomputers by brand in schools; the number of schools having enough microcomputers to support networking; a 'profile' of microcomputers used in the top 50 districts; how states compare in the number of students per microcomputer(s); projected spending of Chapter 2 Federal Funds in the 1983-1984 school year; use of video for instruction in schools; and video users by format and grade span. (LMM).

512,915
ED-246 849 Not available NTIS
Riverina Coll. of Advanced Education, Wagga Wagga (Australia).
Audio Tapes for Distance Education,
E. D. Meacham, and B. A. Butler. 1984, 48p
Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Directed towards academics involved in preparation of distance learning materials, this guide emphasizes the functions of audiotapes within an integrated set of distance learning materials. Planning, production, and evaluation advice is offered, beginning with a discussion of a model approach that focuses on consideration of budget, subject characteristics, tutor characteristics, student characteristics, administrative assistance, arousal and motivation, goal definition, cognitive structuring, signposting, activation, feedback, transfer and retention, assessment, and evaluation. Guidelines for the production process cover scripting (writing style and script structure), and recording from the script (voice, accompanying printed materials, indexing tapes, and interviews). An evaluation checklist includes points concerning the structure of the material,

spoken delivery, technical quality, and accompanying materials. Appendices include an outline model of major design considerations for correspondence materials, a summary of advantages and drawbacks of automatic level recording; self-assessment questions; and a sample audiotape script on the topic of producing audiotapes for distance education. (LMM).

512,916
ED-246 850 Not available NTIS
Alberta Univ., Edmonton.
Cadet Project: Computer Assisted Distance Education Telecommunication for Post Secondary Education in Alberta. Report 1, June 15, 1983, and Report 2, June 18, 1984.
J. M. Kirman, and J. Goldberg. 18 Jun 84, 47p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Two reports discuss pilot projects using the Computer Assisted Distance Education Telecommunication Project (CADET) in Edmonton, Alberta. The first describes two studies that investigated the feasibility of telephone communication between two or more microcomputer (Apple) operators using an Amdahl mainframe computer as an intermediary. The results reported suggest that the CADET system is effective in enabling teachers to promote pupil performance with new subject matters. Seven references are listed and an appendix outlines steps in Visiterm communication between the Amdahl and Apple computers. The second report is concerned with Phase 2 of the CADET project, in which the new CADET file system was field tested through a linkage between the Amdahl computer at the University of Edmonton and four higher education institutions. Problems encountered, recommendations, and advantages are listed. Appendices include 'The CADET Operations Manual,' which covers the CADET system, Visiterm, the communication card and telephone modem, how to sign on and off Amdahl, receiving a message, text editor (prepare a message), text format, sending a message, confidential communications, electronic mail, and some common problems. A trouble shooting check list is included. (LMM).

512,917
ED-246 851 Not available NTIS
Computer Assisted System for Grading Papers,
D. A. Borchardt. 1980, 13p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

A computer assisted system called PEERRATE was used in a theater history course at Rutgers, the State University of New Jersey in Newark, in fall 1980, in order to give students an opportunity to anonymously grade one another's written work and to compare their own ratings with those of fellow students and the instructor. The PEERRATE system is a fairly sophisticated program, written in FORTRAN, that mathematically eliminates rater biases and prints customized rating reports for individual students. It was used to complement a problem-solving class procedure in which students study aspects of theatre history by working in groups and discussing open-ended problems. PEERRATE was used to parallel a teaching strategy–guided design–in which group cooperation is emphasized. It was also used for grading and comparing grades for student reports. The program automatically produces a measure of each student's skill in rating. Part of the rating project involved discussion and agreement on criteria to use in writing the reports. The response to PEERRATE in theater history, psychology, English, composition, and graduate business courses has been generally positive. Using the system in theatre history was particularly helpful for giving students perspective on their own writing. Five references are listed. Tables show rating scales used, criteria definitions, a typical customized printout for an individual student, and achievement scores, rating qualities, and rater abilities in ascending order. (LMM).

512,918
ED-246 852 Not available NTIS
Northwest Regional Educational Lab., Portland, OR. Research on Evaluation Program.
Computers Plus: A Program to Develop Computer Literacy among Educators. Paper and Report Series No. 94,
P. J. Gray, and J. Tafel. Jan 84, 55p
Contract 400-83-0005;
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Designed to be used as a model for workshop planning, this report describes the development and implementation of a series of four summer workshops, entitled 'Computers Plus,' which were designed to increase the computer literacy of teachers and administrators. Intended to provide introductory students with basic concepts, hands-on computer experience, practice in software evaluation, and assistance in planning for microcomputer use, the workshops were offered jointly in June and July 1983 by the Northwest Regional Education Laboratory (NWREL) and the University of Portland in Portland, Oregon. Specific chapters suggest ways to design, organize, and operate workshops in order to meet the needs of diverse students. Evaluation results of the Computers Plus program that are reported are based on responses gathered from the NWREL Technology Center Workshop Evaluation Form and a participant questionnaire, and an assessment of the participants' technology background. Five recommendations and six references are listed. Appendices include the workshop registration form and materials and outlines for the four courses. (LMM).

512,919
ED-246 853 Not available NTIS
Northwest Regional Educational Lab., Portland, OR. Research on Evaluation Program.
Computer Use Planning: A Case Study of a School District's Long-Range Planning Efforts. Paper and Report Series No. 95,
P. J. Gray, and L. J. Rawers. May 84, 66p
Contract 400-80-0105
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Based on a case study of a large northwestern suburban school district's initial attempts to establish policy for school use of computers, this report addresses such general questions as how school districts develop policies for instructional and administrative uses of computers, how school policy formation committees function, and how their operations can be made more effective. Focus is on the operations of the policy formation committee and its activities and products. Following a brief introduction, the research design, data collection, and data analysis procedures are explained. The case study is then detailed, with descriptions of the charge to the committee; its composition, products, processes, and dynamics; and its final report, including an executive summary. The case study analysis procedures are also described, including a comparison and contrast of the final report with the committee's charge; examination of the committee's work in regard to recurrent themes, processes, and issues; and a survey of committee members in which they evaluated various aspects of the committee's work and made recommendations for further action. Conclusions based on study findings and concepts identified in the literature as important to the success of educational innovations conclude the report. Fifteen references are listed and a summary of committee events and associated materials are appended. (LMM).

512,920
ED-246 854 Not available NTIS
Microcomputer Instruction (A Collection of Essays),
M. Ediger. 1982, 44p
Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Issues related to the uses of computers in instruction are discussed in eight brief essays. 'The Word Processor in the Curriculum Today' looks at the implications of changing societal situations for selection of objectives, learning activities, and appraisal procedures that will reflect actual utilization of word processors. Programmed learning with computers and the role of other learning activities to guide optimal learner progress are examined in 'Computer Assisted Instruction and the Learner.' Suggestions for planning inservice programs for teachers and administrators are offered in 'Inservice Education and the Computer.' In 'Computers: Programmed Learning versus Problem Solving,' the range of use of computers in the curriculum from behaviorism to experimentalism is discussed, while in 'Microcomputers in the Mathematics Curriculum,' drill, practice, problem solving, and gaming programs are described. Issues related to implementing use of the computer to aid optimal student achievement are the focus of 'The Microcomputer in the Classroom.' 'The Word Processor in the Curriculum' covers uses of the word processor to teach writing skills. The final essay, 'Philosophy and Goals in the Curriculum,' looks at ways in which specific philosophies can provide direction in determining educational goals, with specific emphasis on essentialism, perennialism, existentialism, realism, idealism, and experimentalism. Four of the essays list references. (LMM).

512,921
ED-246 855 Not available NTIS
Council for Educational Technology, London (England).
Microcomputer Materials from MEP. An Annotated Directory of Packages of Interest to Further Education. An Occasional Paper,
L. Gilbert. Jan 84, 48p ISBN-0-946469-90-3
Contract RP156
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Designed to disseminate information to the post-school sector of United Kingdom education, this directory provides information on 50 microcomputer software packages developed by the Microelectronics Education Program (MEP) and available through educational publishers. Subject areas represented include accountancy, biology, business education, chemistry, careers, design technology, economics, food studies, general studies, geography, health science, home economics, mathematics, numeracy, physics, sciences, social studies, technician courses, vocational preparation, and work experience. For each subject area, information provided includes titles, content descriptions, suitability for individual or group work, learning materials forming the package, source/publisher, and technical specifications for microcomputer hardware. (Author/LMM).

512,922
ED-246 856 Not available NTIS
Northwest Regional Educational Lab., Portland, OR. Research on Evaluation Program.
Policy Analysis: A Tool for Setting District Computer Use Policy. Paper and Report Series No. 97,
P. J. Gray. May 84, 29p
Contract 400-80-0105
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This report explores the use of policy analysis as a tool for setting computer use policy in a school district by discussing the steps in the policy formation and implementation processes and outlining how policy analysis methods can contribute to the creation of effective policy. Factors related to the adoption and implementation of innovations are categorized and used as a framework for discussion. The first category, the climate of change, includes external factors such as social pressure and funding, and district or internal factors. The policy context is the second category; it includes the art of policy setting, a definition of a policy, and how to set policy. Discussion of the final category, the change process, covers procedures for clarifying problems, issues, and needs (PINS); question development; data collection, analysis, and synthesis; and identification of alternative policy options and their implications for implementation. Fifteen references are listed. (LMM).

512,923
ED-246 857 Not available NTIS
Council for Cultural Co-Operation, Strasbourg (France).
Secondary School and the Mass Media Symposium (Grenoble, France, June 29 - July 3, 1981). CDCC Project No. 1 'Preparation for Life',
P. Corset. 1982, 42p ISBN-92-871-0175-2
This work has been published in French under the title: 'Preparation a la vie culturelle. L'ecole secondaire et les medias' (ISBN-92-871-0174-4).
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Part of a major project of the Council for Cultural Cooperation, the project described was specifically designed to identify the aims of, the main approaches to, and problems encountered when teaching secondary school students how to use mass media, and to make proposals on how mass media education can be effectively delivered. Following a brief description of the

project and the symposium program, summaries are given of the following lectures and the ensuing discussions: (1) 'School and Media,' Rene Dubuox (Switzerland); (2) 'The Press in Schools,' Claude Gambiez (France); and (3) 'Television Studies as a Discipline,' L. Masterman (United Kingdom). Two plenary sessions are described, followed by reports from three working groups, each of which briefly discusses four themes in relation to the education of young people in schools: media use and citizen education; young people, adults, and the media; the use of the image in teaching; and the implications of media studies for teacher training. Symposium recommendations are listed in four categories: mass media education, use of the image in teaching, media teaching, and teacher training. General conclusions presented by P. Corset conclude the report. Appendices contain the 'UNESCO Statement for the Symposium on Secondary School and the Media,' by Etienne Brunswic, the Unesco representative, and lists of participants, observers, and journalists who were in attendance. (LMM).

512,924

ED-246 858 Not available NTIS

United Nations Educational, Scientific and Cultural Organization, Paris (France). General Information Programme.

Telecommunication Services for the Transfer of Information and Data: A Case Study in Indonesia,

D. P. Battu, and J. B. Rose. Jan 84, 99p PGI-84/WS/10

Best copy available.

Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This study on the use of telecommunications to improve access to the specialized information needed for development was conducted by a national team and carried out through a series of meetings in Jakarta and Bandung. Persons contacted included Indonesian officials responsible for national development in information and telecommunications, actual and potential major users of data communications, and officials of two regional organizations. A general discussion of the Indonesian situation is followed by a review of current data communication technology, including computer networks, data networks, and ISDN (integrated services digital networks); packet switched data networks; satellite communication; the SATNET experiment; and tele-informatics services. The existing Indonesian telecommunications network is described as well as the development of national telecommunications services, PACKSATNET, and international facilities and regional cooperation. Specialized, organizational, and general information services and needs are discussed, and national strategy options are examined with a look at development strategy for a National Packet Switching Network (NPSN), telecommunications technology for the NPSN, improvement of access to PACKSATNET through PSTN (public switched telephone network) connections, international data connections, Telex aspects, operational aspects and maintenance, databases and computer facilities, tele-informatics services, and investments. International strategy options are also addressed. Conclusions and recommendations cover national policy, regional and international cooperation, marketing and tariff strategy/user awareness, investments, human resources, standards/local manufacture of equipment, and research and development. Twenty-eight references, eight appendices, and sixteen figures are included. (LMM).

512,925

ED-246 860 Not available NTIS

Australian Council for Educational Research, Hawthorn.

Computing in Schools: An Australian Perspective. Australian Education Review Number 21,

J. Anderson. 1984, 111p ISBN-0-85563-358-1

Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Educational applications of computing are reviewed, beginning with a brief introduction to microcomputers and microcomputer characteristics that might be important for school use. An examination of significant models in computer education outside Australia emphasizes projects in the United Kingdom, France, and the United States, including the National Microelectronics Programs in England and Scotland, the British BBC Computer Literacy Project, the 10,000 Microcomputers in School Operation in France, and the Minnesota Educational Computing Consortium. Recent developments at both the state and national levels in Australia are then described. A look at the varied applications of computers in Australian classrooms is followed by case studies of a range of programs, including projects concerned with computer awareness teacher support material, computer studies at the upper secondary level, microcomputers in the primary school, computer-based learning in clinics and classrooms, a school computerized administration system, a statewide computer network, and educational applications of videotex. A concluding chapter outlines some emerging issues in computer education for Australian schools. A seven-page reference list is included. (LMM).

512,926

ED-246 861 Not available NTIS

New York State Dept. of Education, Albany. Center for Learning Technologies.

Guide to Software Selection Resources: Part 1. Educational Technology Resources in New York State,

C. Mojkowski. Nov 83, 45p

Grant NIE-G-82-0017

For Parts 2 and 3, see ED 237 064 and IR 011 194.

Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

First in a series designed to provide teachers and administrators with a reference tool for identifying, evaluating, and selecting software for use in computer-based teaching and learning, this guide describes those resources available through the New York State Education Department and regional services throughout New York. The activities and services of the Center for Learning Technologies (CLT) are highlighted, followed by a description of Demonstration and Technical Assistance Centers and of the CLT's efforts to improve the quality of commercially available hardware. A report on activities conducted to plan and test a statewide telecommunications network emphasizes how the proposed network would facilitate the exchange of information in educational software and technology applications. Two other support resources are discussed, the Media Distribution Network and Computer Training Labs, which provide materials and professional development resources designed to help practitioners bring technology into the classroom. A general purpose glossary and a 38-item bibliography are included. Appendices provide a list of software publishers participating in CLT software initiatives and software publishers who attended a 1982 New York State Department of Education conference. (LMM).

512,927

ED-246 862 Not available NTIS

New York State Dept. of Education, Albany. Center for Learning Technologies.

Guide to Software Selection Resources: Part 3. Reading and Communication Skills,

C. Mojkowski. Nov 83, 30p

Grant NIE-G-82-0017

Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Third in a series, this loose-leaf guide reviews resources for evaluating, selecting, and using software for teaching reading and communication skills. Sources of educational software listed include both commercial publishers and public domain sources. Software selection information sources are divided into journals, newsletters, and special publications; information clearinghouses; and human resources. Automated information clearinghouses are also listed. A checklist (originally prepared by the National Council of Teachers of English Committee on Instructional Technology) contains descriptive, application, and evaluative criteria for use with language arts and general purpose software. Evaluation criteria related to reading and communication skills are discussed, and a section on software application reviews some educational principles and practices related to integrating software with the teaching of English, reading, and writing. A brief discussion summarizes research findings on the effectiveness of computer assisted instruction. Twenty-three references are listed. (LMM).

512,928

ED-246 863 Not available NTIS

Pacific Telecommunications Council, Honolulu, HI.

PTC (Pacific Telecommunications Council) '84. Papers and Proceedings of the Annual Pacific Telecommunications Conference (6th), Honolulu, Hawaii, January 8-11, 1984,

D. J. Wedemeyer, and L. S. Harms. 1984, 262p

ISBN-0-8248-0958-0

For PTC'83, see ED 231 350.

Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This volume includes 29 papers as well as abstracts of several additional presentations from a conference that focused on the process of developing Pacific telecommunication resources to meet the basic needs of the region and on ways of resolving the problems that arise as part of the process. A wide range of current information is provided on needs, resources, and value issues. Papers are grouped by session on the following themes: (1) communication needs of businesses in the local, national, and regional marketplace; (2) needs for telecommunication in rural communities; (3) communication needs of minority groups; (4) meeting the needs: technical and institutional responses; (5) developments in high technology; (6) telecommunication and information technology to meet basic needs; (7) providing for telecommunication service requirements in the local, national, and regional marketplace; (8) effects of telecommunications on daily social activity; (9) problems and progress of new technology; and (10) economic demand for telecommunications as a reflection of needs in the Pacific Region. Some papers provide references. (LMM).

512,929

ED-246 864 Not available NTIS

Georgia Inst. of Tech., Atlanta. School of Industrial and Systems Engineering.

Review of the Literature on Training Simulators: Transfer of Training and Simulator Fidelity,

Y. D. Su. Apr 84, 84p TR-84-1

Contract N00014-82-K-0487

Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This report summarizes transfer of training methodologies, beginning with a discussion that defines simulators, fidelity, and realism, and briefly reviews simulator use in training. Two types of training are identified--training for system operation and training for maintenance (troubleshooting). An outline categorizes current research issues on simulation by training strategy, instructional methods, training for normal operation, maintenance and procedural training, training device design, performance measure, cost effectiveness of training devices, and methodology considerations. The evaluation of training effectiveness of simulators is discussed in terms of the experimental paradigm commonly used, performance measurement, and criticism and modification of the paradigm. Simulator fidelity is examined in detail, including its definition, relationship with training, its measurement, and its components, which include stress, environment, layout, wholeness, dynamics, abstraction, and state variables. Research on simulator training is reviewed in terms of new technology, validation of models, acquisition and decay of training, individual differences, skill level variances, performance measurement, decision aids, and mental models. Conclusions focus on the basic remaining problems of using simulators for training, including transfer effect, fidelity level, and their relation to cost. Eighty-eight references are listed. (LMM).

512,930

ED-246 866 Not available NTIS

Air Force Human Resources Lab., Wright-Patterson AFB, OH.

Simulated Three-Dimensional Computer Graphics Training Display for Air Weapons Controllers.

Final rept.,

L. S. Finegold. Apr 84, 54p AFHRL-TP-83-62(I)

Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

The research and development project demonstrated the viability of a simulated training system to address training issues related to three-dimensional air intercept tactics and geometry, and resulted in the production of two videotapes for use in the United States Air Force Interceptor Weapons School. An introduction discusses the overall development of the system, which provided the capacity to display and control up

to three aircraft in a defined airspace. Additional supplemental graphics to address specific training uses were also developed using full-color, raster-scan, animated microcomputer display technology. Project background, objective, approach used, and results are discussed, including a summary of the major technological difficulties encountered. An overview then describes the system and provides details on hardware and firmware, applications software, the visual scene, two versions of the aircraft display and control software, special graphics relating to training issues, and system use. A final discussion includes a summary, an outline of technical issues, and conclusions. Sixteen references and a 26-item bibliography are included. (LMM).

512,931
ED-246 867 Not available NTIS
(Some) Computer Futures: Mainframes,
E. C. Joseph. Jun 84, 12p
Paper presented at the Annual Assembly of the World Future Society (5th, Washington, DC, June 7-10, 1984).
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Possible futures for the world of mainframe computers can be forecast through studies identifying forces of change and their impact on current trends. Some new prospects for the future have been generated by advances in information technology; for example, recent United States successes in applied artificial intelligence (AI) have created new opportunities for the computer and communication industries. The Japanese reacted to the breakthrough of practical artificial intelligence with their own projects. The United States and Europe quickly reacted to the Japanese with such research and development projects as the Semiconduction Research Corporation, the Department of Defense Advanced Research Projects Administration, and the European Strategic Program for Research and Information Technology. New developments spawned by international competitive forces for change have resulted in forecastable expectations for more capabilities and lower costs in chip and wafer-scale component integration, micro-sensors, communication links and interfaces, AI expert knowledge bases, and microcontrollers and activators. With such technological advances, new computerized communications systems will become possible, such as current awareness systems and cooperative systems, and the new computer revolution that is beginning now will have a strong impact on society in the late 1980's and 1990's. (LMM).

512,932
ED-246 868 Not available NTIS
Further Education Unit., London (England).
Survey of IT Policy and of Current Practice in a Sample of Colleges. Information Technology in FE. An Occasional Paper.
Apr 84, 34p ISBN-0-946469-11-3
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

A 1983 site-visit survey of 20 colleges actively engaged in developing their information technology (IT) expertise and resources indicate that many teachers do not appreciate the relevance of the computer to their work; few colleges have an effective and structured approach to IT in terms of staffing, equipment, or application; and lack of relevant software is a significant practical constraint on IT development. This report highlights various factors that need urgent attention if IT is to be tackled effectively by the further education (FE) sector. A table of IT usage by departments is included as well as the typical courses available in information technology. Case studies of individual departments with successful IT applications are also provided to demonstrate how a considerable amount can be done with limited resources. Findings are summarized for college development policies relating to IT; the role of the local authorities in IT development; sources of income for purchasing IT equipment; IT equipment in the colleges; staffing and accommodation; IT in the departments; non-academic uses of IT; links with schools; IT for the unemployed; liaison with local industry; the effect of the introduction of IT in the design of 'mainstream' curricula; staff development; and college plans for future development. Appendices include additional information on the survey methodology, descriptive examples of good practice, and a glossary. (LMM).

512,933
ED-246 869 Not available NTIS
Cognitive Psychology and Its Implications for Designing Drill and Practice Programs for Computers,
D. F. Salisbury. Apr 84, 25p
Paper presented at the Annual Meeting of the American Educational Research Association (New Orleans, LA, April 23-27, 1984).
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This paper summarizes research in modern cognitive theory that relates to the role of computer drill and practice programs in learning and describes a prototype program that exemplifies recommended characteristics. Focus is on four major issues that are relevant to the design and optimization of computer drills: interference, spaced practice, spaced review, and capacity of short term memory. Implications for the design of computer drills are suggested, including the need to: (1) present similar items in close proximity to each other; (2) emphasize differences between similar items; (3) provide a mechanism to keep track of the items that a particular learner was working on during the last session; (4) provide a mechanism for reviewing items previously learned, based on the amount of time since the learner last responded to each item; (5) utilize increasing ratio-review; (6) present only a few items of information to the learner at once; and (7) combine meaningful stimuli into a single stimulus as chunking occurs. Some areas for future research are suggested, and 32 references are listed. (LMM).

512,934
ED-246 870 Not available NTIS
Computers in the Schools: State/Provincial Implications,
S. J. Thiessen. Apr 84, 8p
Paper presented at the Annual Meeting of the American Educational Research Association (New Orleans, LA, April 23-27, 1984).
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

The Alberta goverment has attempted to systematically address educational computing issues through programs of the provincial (K-12) education department (Alberta Education), which have included the development of computer literacy curricula for elementary, junior, and senior high schools; the Computer Technology Project (CTP); evaluation studies; and the Minister's Task Force on Computers in Schools. These efforts were designed to address major computing issues of availability and quality of educational software; provision of teacher inservice opportunities; computer literacy for students; and short- and long-range planning for educational computing activities. All courseware evaluation activities and seminars have been standardized on the Apple II microcomputer. Emphasis has been on evaluating existing programs before developing new courseware. The CTP focuses on teacher inservice and courseware evaluation, including: (1) development of computer-related inservice seminars; and (2) systematic evaluation of Apple II instructional courseware by subject area through a three-stage evaluation process. Other departmental activities have included provincial governmental assistance for school districts purchasing microcomputers for business education programs, and a small grant to each school system for professional development. (LMM).

512,935
ED-246 871 Not available NTIS
Developing and Assessing Visual Thinking,
M. L. Martinello, and L. Mammen. 1982, 26p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

A three credit undergraduate course, offered through a University of Texas Gifted and Talented Program to qualified high school students, used material objects in a museum to promote visual thinking. Fourteen students were enrolled in the course, which included four interacting units of study: (1) using the operations and strategies of visual thinking; (2) responding to the visual elements in artworks and artifacts; (3) interpreting artifacts in their historical context; and (4) designing small exhibits. A formative evaluation used a written test matched to course goals which was administered prior to, at the midpoint, and at the end of the course. Results indicated that students emphasized fact-seeking in the questions they applied to objects, and that they could respond to visual elements in describing objects but could not apply those same elements to object exhibition. The most demonstrable contribution of the course to student learning was in thematic awareness. The study suggests developmental stages for the ideation and communication of imagery. These stages assume that skill develops from the following: (1) exposure to models of expressed imagery; (2) practice in seeing wholes and parts and opportunities to repattern perceptions; (3) activities in graphic ideation which consciously remove existing labels; and (4) efforts to replace the old labels with new ones that communicate mental impressions through visuals and words. (LMM).

512,936
ED-246 872 Not available NTIS
Southwest Educational Development Lab., Austin, TX.
Distance Learning: A Review for Educators,
H. E. Hudson, and C. H. Boyd. Mar 84, 75p
Contract 400-83-0007
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Designed to provide an overview for educators, this report summarizes experiences to date with applications of communications and computer technology to distance education. Findings relevant to educators concerned with grades K-12 in the six-state region of Arkansas, Louisiana, Mississippi, New Mexico, Oklahoma, and Texas are emphasized. A brief overview of potential distance education technologies covers (1) audio technologies such as audio teleconferencing, audio graphics, freeze-frame video, radio broadcasting, and audio cassettes; (2) computer communications including electronic mail, computer conferencing, and computer-assisted instruction; (3) teletext and videotex; (4) interactive videotape and videodisc; (5) television including Instructional Television Fixed Service and cable systems; and (6) communication satellites. Important factors in evaluating distance learning projects are examined, including student performance; performance of hardware and software; capital, start-up, and operating costs; level of complexity of software development; attitudes of teachers, learners, and project staff; and relationship of project goals to institutional goals. A review of significant projects drawn from the United States, Canada, Great Britain, and developing countries includes examples of applications using each of the technologies reviewed. An analysis of key findings follows each group of project summaries. Final observations are drawn from the project review and distance learning research, and a four-page bibliography is provided. (LMM).

512,937
ED-246 873 Not available NTIS
Southwest Educational Development Lab., Austin, TX.
Issues of Law and Policy Affecting Telecommunications-Based Distance Learning,
M. B. Goldstein. Mar 84, 92p
Contract 400-83-0007
One table uses small print.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This study explores the degree to which the delivery of elementary and secondary instruction through the use of telecommunications is constrained by federal and state law, and examines the nature of the constraints and their implications for the present and future use of telecommunications-based delivery instruction to students within the age of compulsory education. The state and federal roles in the control and financing of elementary and secondary education are outlined, and state regulation of precollegiate education is discussed with particular regard to regulation of finance, institutional approval, and the concept of attendance. Issues are identified which concern the potential conflict between state control of education and federal preemption of most aspects of telecommunication. The effects of regulatory constraints on the uses of telecommunications-based instruction on the provision of postsecondary education are also discussed as an indication of what may be faced by the primary and secondary education sector. Conclusions and six tables are included. (LMM).

512,938
ED-246 874 Not available NTIS
Southwest Educational Development Lab., Austin, TX.
Survey on Uses of Distance Learning in the U.S,
D. E. Downing. Mar 84, 53p
Contract 400-83-0007
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

A December 1983 survey queried the chief state school officers of the 50 states on the extent to which distance learning techniques are used in public education in their states. Respondents were asked to focus on interactive forms of distance learning, such as audio and video teleconferencing. A total of 28 states (56%) responded, with the following 14 states indicating that there were no current projects involving distance learning in their states and no plans for future implementation: Arkansas, California, Delaware, Florida, Kentucky, Idaho, Maine, Michigan, Mississippi, Missouri, New Hampshire, New Jersey, North Dakota, and Tennessee. A wide range of current activities and future plans in distance learning technologies were indicated by the remaining 14 states of Alabama, Alaska, Illinois, Maine, Minnesota, Nevada, New Mexico, New York, North Carolina, Oregon, Pennsylvania, South Carolina, Texas, and Wyoming. Individual responses of the state departments of education are presented for each of 10 questions covering resources, financing formulas, numbers of projects or sites, training required of teachers, subject areas involved (basic skills, languages, science) and types of courses (full course, motivational, supplemental) being delivered by distance technologies, course development, state accreditation, administrative uses of telecommunications, and state-level planning for the future. The survey instrument and a list of respondents are appended. (LMM).

512,939
ED-246 875 Not available NTIS
Educational Software and Other Learning Materials: A Look at the Differences,
P. K. Komoski. 23 Apr 84, 29p
Paper presented at the Annual Meeting of the American Educational Research Association (New Orleans, LA, April 23, 1984).
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Factors contributing to the uniqueness of educational software are analyzed from contextual and textual perspectives. Contextual (or external) technological, economic, and social factors are examined briefly, and are identified as the dominant factors in the future evolution of educational software. Feedback and interactiveness, two significant textual or internal factors that constitute major differences between educational software and other learning materials, are discussed within a framework of a theoretical learning materials continuum. These factors are identified as contributing to the development of 'instructuring' software, which enables learners to learn independently. Other types of structured software requiring a different type of teacher involvement than that required by traditional instructional materials are also discussed. Questions are raised as to whether and how contextual and textual factors (especially the potential development and use of feedback-based, interactive, instructuring software) may affect current and future educational practices and policies, and some possible effects on the curriculum and on teachers' changing roles are discussed. The role of the home market is stressed along with the need for educator-parent cooperation to ensure a more integrated approach to in-school and at-home use of educational computing. Six references are listed. (Author/LMM).

512,940
ED-246 876 Not available NTIS
Southwest Educational Development Lab., Austin, TX.
Effectiveness of Microcomputers in Education,
F. D. Ploeger. 1983, 105p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This in-depth review of the literature synthesizes articles and abstracts identified as education-oriented microcomputer research studies published since 1979. A brief, historic overview of educational computing is followed by a review of the Becker (1983) survey, which concerned the distribution of microcomputers in education in the United States, and of several other survey studies that provide a framework for viewing the research. Differences in research using microcomputers and main frame computers are outlined. Case studies and reports suggest the types of microcomputing efforts that are representative of the major areas of emphasis in instructional microcomputing. Specific research studies on microcomputers are then grouped by the following content areas: general learning, computer literacy, mathematics, music, reading, science, and typing; a summary is provided for each content area. Conclusions based on the research reviewed indicate that instructional microcomputing can be a valuable educational tool; that affective factors such as motivation and self-esteem are enhanced through the inclusion of microcomputers in an instructional setting; and the use of instructional microcomputing is most effective as an adjunct to traditional instructional methods. A 12-page bibliography is included. (LMM).

512,941
ED-246 877 Not available NTIS
Effects of Computer-Based Teaching on Learners,
J. A. Kulik. Oct 83, 10p
Paper presented at the National Forum of the College Board Symposium on Computer Competency and the Curriculum (Dallas, TX, October 1983).
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Although some aspects of the educational effects of computer assisted instruction (CAI) are still unclear, some research findings are now quite definite. Two meta-analysis reviews of CAI have been completed at the University of Michigan, one on secondary school teaching and one on college teaching, and their findings have been independently verified by independent meta-analyses. Conclusions are that CAI (1) has real potential as a tool in improving student achievement in precollege classes; (2) fosters positive attitudes toward the computer; and (3) can produce substantial savings in instructional time. Findings on CAI outcomes are very robust, with differences in instructional environments, samples of students used, and methodological designs of studies having no substantial effects on outcomes of CAI and conventional teaching. The effectiveness of CAI may be limited by its use as a complete replacement for conventional instruction and enhanced by the use of up-to-date programs and computers. A safe conclusion is that the computer can be used to help learners become better readers, calculators, writers, and problem solvers. Six references are listed. (LMM).

512,942
ED-246 878 Not available NTIS
Effects of Sex, Age, and Computer Experience on Computer Attitudes,
B. H. Loyd, and C. Gressard. Feb 84, 24p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This study examined the effects of computer experience, age, and sex on attitudes toward computers among 142 high school language arts students, 107 community college mathematics students, and 105 students living in dormitories at a small liberal arts college. Computer attitudes (computer anxiety, computer confidence, and computer liking) were measured by the Computer Attitude Scale (Loyd and Gressard, 1984), which was administered by the teachers, instructors, and dormitory supervisors. The instrument provides three subscales of 10 items each and presents positively and negatively worded statements such as, 'Computers make me feel nervous and uncomfortable,' with a four-point response scale. Results showed that the students, as a whole, had fairly positive attitudes toward computers. Computer experience was significantly related to more positive attitudes on all three subscales. Significant age effects were found for the subscale 'computer liking,' but no clear trend for age was demonstrated. Sex was not significantly related to computer attitudes on any of the three subscales. Seven tables and a five-item reference list are included. (Author/LMM).

512,943
ED-246 879 Not available NTIS
Frisco Independent School District, Allen, TX.
Framework for Educational Computer Usage. K-12,
J. Berry. 1983, 19p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

A framework for educational computer usage in grades K-12 is outlined. For each grade level, objectives are shown for the following knowledge areas: computer-related terminology and use; history and development of computers; the use of the computer as a tool; communicating instructions to the computer; social implications; and robotics. Suggested activities correlated to the computer curriculum objectives are separately listed for grades K-2, 3-5, 6-8, and 9-12. A computer curriculum resource bibliography is included. (Author/LMM).

512,944
ED-246 880 Not available NTIS
Investigation of the Effects of Math Anxiety and Sex on Computer Attitudes,
C. Gressard, and B. H. Loyd. Apr 84, 17p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

The effects of math anxiety and sex on computer anxiety, computer confidence, and computer liking were investigated with 161 junior high and high school language arts students; 119 community college mathematics students; and 76 college students residing in dormitories. The Computer Attitude Scale (Loyd and Gressard, 1984) was used to measure attitudes toward learning about and using computers. Each of its three subscales consists of 10 items and presents positively and negatively worded statements such as, 'Computers do not scare me at all,' with a four-point response scale. Math anxiety was measured with a modified version of the Mathematics Anxiety Scale (Fennema and Sherman, 1976). Results indicate that, after controlling for experience, math anxiety explained a significant addition of variance for computer anxiety, computer confidence, and computer liking. Sex differences were not significant. These findings suggest that schools may need to decentralize their computer activities in order to help counter the association of computers with mathematics; studies of math anxiety may provide insight into computer anxiety; and successful math anxiety treatments may also help to relieve computer anxiety. Six references and six tables are included. (Author/LMM).

512,945
ED-246 882 Not available NTIS
Ohio Educational Library/Media Association, Columbus.
Microcomputers in the Media Center,
V. Sherouse, and R. Post. 1983, 65p
Monograph Series Title No. 8.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Produced to provide educators and library media personnel with some understanding of and direction in the rapidly expanding field of microcomputers and their applications, this monograph includes several articles dealing specifically with media center applications and others concerned more generally with the microcomputer in educational settings. The following articles are included: (1)'The Microcomputer and the School Media Center,' Vicki Sherouse; (2) 'Selecting a Microcomputer for the Media Center,' Vicki Sherouse; (3) 'Computer Software Selection,' Richard Post; (4) 'Cataloging and Storing Microcomputer Materials,' Kathy Knell; (5) 'Microcomputer Management,' Roger Burgess; (6) 'Using a Microcomputer for Media Center Administration,' Vicki Sherouse; (7) 'Setting Up In-Service Programs about Computers,' Steven Hawley; (8) 'Microcomputer Languages,' Fred Williams; (9) 'Troubleshooting Microcomputers,' Weston Orloff; (10) 'Networking: Vital Links to a Total Information System,' Keith Bernhard; and (11) 'Interactive Video,' Richard Post. Also included are a glossary by Lenora Ferdinand, and a 12-page list of selected references about microcomputers compiled by Greg Byerly and Clara O. Jackson. (LMM).

512,946
ED-246 883 Not available NTIS
Southwest Educational Development Lab., Austin, TX.

Research and Development Speaks: Evaluation of Educational Software.
Mar 83, 111p
Contract 400-83-0007
Proceedings of a Southwest Educational Development Laboratory Regional Exchange Project Conference, Austin, TX, March 16-17, 1983. For related documents, see ED 237 064 and IR 011 216.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

A brief introduction states the purpose of and summarizes the five presentations made at a Southwest Educational Development Laboratory Regional Exchange (SEDL/RX) Project conference and notes that the SEDL/RX publication, 'Evaluation of Educational Software: A Guide to Guides,' was produced for use as a reference guide by participants in this conference. In the keynote address, the only presentation for which the full text is included, Vicki Blum Cohen describes a learner-based courseware evaluation project which was conducted in 1982 at the Microcomputer Resource Center of Teachers College, Columbia University. Supplementary materials are provided for the remaining presentations, which included a description by Vicki S. Smith of the Texas Education Computer Cooperative's training process for its network members in 20 regional education service centers; a lengthy teleconference presentation by Pristen Bird on approaches to the evaluation of educational software in Florida; Bruce Hagen's teleconference presentation of more than an hour on activities in California, including the 15 regional Teacher Education and Computer (TEC) Centers and the California Software Clearinghouse; and Patricia Sturdivant's explanation of the Houston Independent School District's participation in the Urban Technology Consortium of six school districts around the United States which provides for mutual exchange of software reviews. The conference program, names of participants, and a 19-page list of software evaluation resources complete the volume. (LMM).

512,947
ED-246 884 Not available NTIS
Southwest Educational Development Lab., Austin, TX.
R&D Speaks: Microcomputers & Education.
Nov 81, 142p
Contract 400-80-0107
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Developed to share information presented at a Southwest Educational Development Laboratory Regional Exchange (SEDL/RX) conference, this document includes reports and related materials on educational computing applications in southwestern school districts and states. Basic computer terminology is defined, and software evaluation instruments are provided from the Educational Products Information Exchange Institute (EPIE) and the Microcomputer Software and Information for Teachers (MicroSIFT) project. An article entitled 'Computing Competencies for School Teachers,' by Jim Poirot, Robert Taylor, and Jim Powell, discusses three sets of teacher competencies: universal computing competencies, competencies needed by teachers of computing, and additional subject-specific computing competencies. Thirty-nine references are listed. Individual reports describe educational computer programs in the following school districts: North Little Rock Public Schools, Arkansas; Humphreys County School System, Mississippi; Jackson Public Schools, Mississippi; Bloomfield Municipal Schools, New Mexico; Putnam City Schools, Oklahoma; and Dallas Independent School District, Texas. A regional sampler includes reports from state education agencies by Sara Murphy, Arkansas; Sue Wilson, Louisiana; Gary Green, Oklahoma; and Gary Haseloff, Texas. A program lists the conference goals, agenda, presenters, participants, and 10 software evaluation resources. Conference evaluation results and a description of SEDL/RX are included. (LMM).

512,948
ED-246 885 Not available NTIS
Research on and Research with Interactive Video.
P. J. Brody. Apr 84, 13p
Paper presented at the Annual Meeting of the American Educational Research Association (New Orleans, LA, April 23-27, 1984).
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This paper suggests how educational researchers should approach interactive video in order to avoid errors found in traditional research on newly-developed instructional media. A distinction is made between research on interactive video and research with interactive video. Research on interactive video is divided into research which attempts to determine how to increase its effectiveness and research on how it relates to the broader instructional environment. The need for additional research on a number of issues which may be useful in increasing effectiveness is discussed, including the nature of interactivity, learner control, and the types of instructional functions facilitated by requiring an active learner response in an interactive video environment. Topics related to placing interactive video in a broader context that are discussed include whether the attributes generally associated with computers or video function differently in an interactive video environment and the methodologies used to examine interactive video. Attention is then devoted to how interactive video and its unique set of characteristics can be used to study other issues, such as concept acquisition and alternative branching strategies. (LMM).

512,949
ED-246 886 Not available NTIS
Johns Hopkins Univ., Baltimore, MD. Center for Social Organization of Schools.
School Uses of Microcomputers: Reports from a National Survey. Issue No. 5.
Jun 84, 14p
For related document, see ED 242 297.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

School location of microcomputers and its impact on use were examined using data from the National Survey of School Uses of Microcomputers. An analysis of the responses from 1,082 (68% of the sample) microcomputer-using, public and non-public, elementary and secondary schools surveyed between December 1982 and March 1983, suggests that where schools locate microcomputers does have an impact on how they are used. Keeping microcomputers solely in classrooms has largely negative consequences, although equity of use is improved for secondary schools, while putting computers into a laboratory situation has generally positive consequences, except for equity. Locating computers in libraries may improve equity in elementary schools and increase use by secondary teachers and students, but has little impact on learning or social and organizational outcomes. Rotating microcomputers from room to room is generally positive for secondary schools and improves equity and access at elementary schools, but allows insufficient time for student learning with the computer. Dispersing microcomputers among several locations has negative consequences for elementary schools, but provides increased microcomputer access to larger groups and a broader range of activities in secondary schools. A technical appendix describes the regression analysis of location effects. Five tables are included. (LMM).

512,950
ED-246 887 Not available NTIS
Southwest Educational Development Lab., Austin, TX.
SEDL's (Southwest Educational Development Lab.) RX: A Workshop Package for Computer-Using Educators.
L. A. Lloyd. 1983, 51p
For related document, see ED 237 064.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Designed to complement the manual, 'Evaluation of Educational Software: A Guide to Guides,' which provides an overview of 10 different models of microcomputer courseware evaluation instruments, this 5-section workshop guide outlines an approach to using the evaluation materials in a hands-on workshop setting. Session notes, reproducible handouts for the participants, and suggestions for implementation are included. The workshops begin with a discussion of key features of instructional and message design, including learning (cognitive) processes such as use of aids to memory and attention; language use and text characteristics; graphics and visual processing; the user's cognitive model; and feedback techniques. An overview covers the range of forms available in the 'Guide to Guides.' Procedures for hands-on evaluation of a correlated set of software examples (not included) are suggested, as well as alternatives to using the examples for groups without access to a compatible computer. The next section provides opportunities to describe and compare procedures, criteria, and formats of the 10 evaluation forms from the 'Guide to Guides.' Notes for the final session describe evaluation resources. Additional suggestions for the workshop group leader are included. (LMM).

512,951
ED-246 890 Not available NTIS
Association for Educational Communications and Technology, Washington, DC.
Video as a Medium for Sharing Experience. Opportunities to Learn No. 1.
6 May 83, 19p
Contract 300-81-0421
Contained in ED 235 794.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Satellite telecasts and videotape are discussed in this two-part paper, which is based on the preliminary experiences of Project BEST (Basic Education Skills through Technology), a dissemination project for communicating about the use of technology in teaching basic skills, and providing functional experience with new information communication technologies. The first section covers the project's experiences with conducting three satellite teleconferences, which were originally designed as work sessions to involve project staff and state team members in the development of video modules and other awareness/training materials. Problems in the perception of the medium as a presentation medium rather than a communication medium are discussed, and some general thoughts, perceptions, and rules-of-thumb about video teleconferences are offered. The second section discusses videotape as an 'experience-linker' and describes the development of videotaped materials for state use with local schools. These videotapes would document the key experiences of school practitioners who have been using microcomputers effectively in basic skills education. Observations in this section focus on what the viewer brings to the viewing experience, capturing and portraying the multidimensions of reality, and unanticipated consequences. Issues related to holding viewers' attention are also examined. (LMM).

512,952
ED-246 891 Not available NTIS
International Extension Coll., Cambridge (England).
Administration of Distance-Teaching Institutions. Case Studies.
1983, 118p ISBN-0-9903632-26-8
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Designed to supplement the main text, 'Administration of Distance-Teaching Institutions,' this volume presents 29 case studies of varied distance teaching projects, which are primarily excerpted from published books, journals, and reports, and chosen to illustrate particular themes, such as organization and administration of distance teaching, departmental organization, program coordination, budgets, and constitutions. Distance education programs and topics discussed include intensive course writing; ACPO (Accion Cultural Popular), a radio school in Colombia; radio at the Lesotho Distance Teaching Centre; broadcasting at the Mauritius College of the Air; the University of Lagos Correspondence and Open Studies Unit broadcasts; telephone tutoring in Australia; two-way radio in Malawi; radio learning campaigns; study centers at the British Open University, in Botswana, and in Nigeria; the National Extension College; and the Sudan Extension Unit. (LMM).

512,953
ED-246 892 Not available NTIS
International Extension Coll., Cambridge (England).
Administration of Distance-Teaching Institutions. A Manual.
T. Dodds. 1983, 173p ISBN-0-903632-25-X
A course production game referred to in the manual is not available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Guidance for distance teaching media selection, management, and program organization is offered in this

two-part manual. Each of eight units includes questions to be addressed, behavioral objectives, comments, exercises, and assignments. The first unit, a general introduction to distance teaching, is followed by four units covering distance education media, i.e., choosing what media to use; managing print; managing radio broadcasts and audio recordings; and organizing student services. Different ways of organizing media and advantages and disadvantages of each approach are examined. The importance of external factors--e.g., the distance teaching program's context, intended students, and purposes--is stressed both for selecting media and for determining how they should be organized. The second part examines how these choices are reflected in the organization of the whole program, and how the various parts and media fit together into an overall administrative pattern. Individual units address external organization, relations with other organizations, and determining costs and budget. (LMM).

512,954
ED-246 894 Not available NTIS
International Extension Coll., Cambridge (England).
Practical Research in Distance Teaching: A Handbook for Developing Countries,
R. Mitton. 1982, 328p ISBN-0-903632-24-1
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

The linking of research and action, basic methods of social research, and the uses of research in distance teaching are examined, with examples drawn from the Lesotho Distance Teaching Centre and other distance teaching programs. Ways in which research can be useful and early stages of research design and planning are discussed. An explanation of basic research methods describes observation and discussion techniques and then details the steps involved in conducting social surveys, including sampling, creating questionnaires, survey fieldwork, data processing, and checking and reporting survey results. Experimental research is also addressed, and basic statistical concepts are introduced. Suggestions for applications of research in distance teaching settings relate to assessing instructional materials, pre-testing instructional materials, keeping regular records, and evaluation. Appendices contain additional information on statistical procedures, statistical theory, and costing, and an annotated list of 20 recommended readings. A four-page reference list, a list of potentially helpful organizations, and basic statistical tables are included. (LMM).

512,955
ED-246 895 Not available NTIS
International Extension Coll., Cambridge (England).
Secondary Education at a Distance. IEC (International Extension College) Broadsheets on Distance Learning No. 12,
H. Perraton. 1983, 83p ISBN-0-903632-31-4
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

One of a series offering practical advice and information on distance teaching, this broadsheet focuses on the ways in which distance teaching can support, expand, and change secondary education. Traditional criticisms of secondary schools are examined, including their irrelevancy, inefficiency, and inequity. Issues of distance education curriculum, expansion, and quality are first viewed by considering the ideas of several visionary reformers: (1) Henry Morris, who reorganized education in Cambridgeshire; (2) Francisco Villen Lucena, who set up Radio ECCA in the Canary Islands; (3) H. Rex Lee, who saw television as a tool to reform education in American Samoa; (4) the National Christian Council of Kenya, who developed village polytechnics; and (5) Patrick van Rensburg, who established the Brigade movement in Botswana. Three models for providing face-to-face support for distance education programs are examined, with specific examples based on the type of program involved, i.e., students working primarily at home, alternative schools which use mass media to offer secondary qualifications, or use of mass media to raise educational quality within a school. Examples describe face-to-face support systems for each model. Summary statements on the successes and failures of distance education, conclusions, and a 34-item reference list are included. (LMM).

512,956
ED-246 896 Not available NTIS
International Extension Coll., Cambridge (England).
Writing for Distance Education. A Manual for Writers of Distance Teaching Texts and Independent Study Materials,
L. K. de Jardon. 1983, 91p ISBN-0-903632-16-0
The manual was drafted by Judy el Bushra and others.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Six instructional units offer guidance in the process of writing printed educational materials. Each unit provides objectives, writing exercises and activities, and end-of-unit discussion questions. Unit 1 considers the first steps in writing, emphasizing the importance of varying instruction according to student needs and background and discussing how people learn. Active learning and different types of learning activities are then examined in the second unit. The third addresses ways of improving a presentation, such as writing in an appropriate style; using clear, simple language; and trying alternative presentation forms, such as pictures and diagrams. Unit 4 covers all steps of production and starts students on an individual project to produce materials in their own subject. Four stages of systematic planning are covered: identifying a need, formulating objectives, listing resources and constraints, and preparing an outline plan. Unit 5 emphasizes specific instructional writing skills with advice on distinguishing between different kinds of instructional materials, what to include and how to organize it, and writing correspondence units. The final unit outlines processes of editing, piloting, reproducing materials, administration, tutoring, and evaluation. Four supplements provide additional information on learning theories, behavioral objectives, media, and readability and layout. (LMM).

512,957
ED-246 897 Not available NTIS
International Extension Coll., Cambridge (England).
Writing for Distance Education. Samples Booklet.
1983, 46p ISBN-0-903632-16-0
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Approaches to the format, design, and layout of printed instructional materials for distance education are illustrated in 36 samples designed to accompany the manual, 'Writing for Distance Education.' Each sample is presented on a single page with a note pointing out its key features. Features illustrated include use of typescript layout, a comic strip story, various question and instruction formats, check lists, signs and a key, study guidance, diagrams, list formats, pictures reinforcing written messages, objectives, culturally relevant design, charts, flowcharts, tables, photographs, and illustrations. Materials used in the examples are taken from a variety of actual projects and courses--e.g., biology, French, English, German, mathematics, educational studies, introduction to the computer, and vegetable growing--in such institutions as the Mauritius College of the Air, Javeriana Open University (Colombia), Botswana Extension College, Kenya Cooperative College, Open University, Lesotho Distance Teaching Centre, and the National Extension College. (LMM).

512,958
ED-246 899 Not available NTIS
Department of Education, Canberra (Australia).
Satellites, Telecommunications and Education: A Resource Guide for Australian Educators.
P. B. White. Nov 83, 87p ISBN-0-642-87528-6
This report was prepared by the Commonwealth/State Advisory Committee on the Educational Use of Communications Technology.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This 206-item annotated bibliography focuses on projects which place the use of new communications technologies within an educational planning framework and which acknowledge the need for communications satellites to be considered as part of a total telecommunications system. Though citations included relate primarily to the uses of telecommunications or communications satellites, some material on the educational use of broadcasting is also listed. Most of the documents and journal articles cited were originally located through a May 1982 search of the following major educational databases: Resources in Education and the Current Index to Journals in Education (from 1969), Australia Education Index (from 1957), and British Education Index (from 1972). Topics and projects addressed in the articles include the Appalachian Education Satellite Project, distance education, Home Loan Video, Dial Access, project evaluation, videotex, teleconferencing, audio tutorials, and new technologies. Key words are listed with each abstract. An appendix briefly describes eight projects funded by the Commonwealth/State Advisory Committee on the Educational Use of Communications Technology (ACEUCT). (LMM).

512,959
ED-246 902 Not available NTIS
Information Economy: What's an Educator to Do,
C. Y. Levinson. Jul 84, 11p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

In order to learn more about the problems of educating students to adequately prepare them for jobs in today's information economy, leaders in education, government, business, and civic organizations met in June 1983 at the Southwest Educational Development Laboratory (SEDL) in Austin, Texas. The symposium participants came from and research focused on the six states of Arkansas, Louisiana, Mississippi, New Mexico, Oklahoma, and Texas. As a result of the presentation of research and trends and the discussions following the presentations, the participants suggested the following recommendations for the future: (1) conducting research on the effects of regulation and deregulation of information technology policy on education; (2) consideration by state and federal policymakers of the needs of education during the development of information and communications policy; (3) equitable allocation of resources, including equipment, materials, and assistance; (4) development of curricula promoting skill in communication, synthesis, and quantification; and (5) decisionmaking by representatives of industry, community groups, and pre- and post-secondary educators regarding the responsibility of each segment in the general education and career training of youth. It is concluded that a multi-pronged approach must be taken to ensure that the needs of learners in the current information economy are met. (DMC).

512,960
ED-246 903 Not available NTIS
Aichi Univ., Toyohashi (Japan). Center for Educational Technology.
Japanese-English Educational-Use Keyword Equivalents Selected from ERIC Descriptors--9th Edition.
Sep 83, 403p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This book lists 4,876 descriptors selected from the Thesaurus of ERIC Descriptors, 9th Edition, with their Japanese language equivalents. It was prepared by personnel of the Center for Educational Technology at Aichi University of Education, which, since 1978, in cooperation with Unesco's Asian Programme of Educational Innovation for Development (APEID), has been collecting and preserving research reports published in Japan related to educational technology, as well as preparing and publishing English language abstracts of these reports. In order to make information about these reports more accessible to researchers and organizations, the project has also included the assignment of keywords. This book was prepared to assist researchers from other countries to use this system of keywords, and is a step toward preparation of Japan's own educational thesaurus. It does not include descriptors which had the comment 'invalid descriptor' under the scope notes nor does it include identifiers. The second section of the book is a listing of the Japanese terms (in 'kana' order) followed by their English equivalents, making it possible to back reference from Japanese to English. (DMC).

512,961
ED-246 904 Not available NTIS
Wisconsin Univ.-Stout, Menomonie.
Library Awareness/User/Needs Assessment. Parts 1, 2, and 3,
J. J. Jax. Jan 84, 149p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This study reports the findings of two surveys conducted in 1983 by the University of Wisconsin-Stout's (UW-

Stout) Library Learning Center. The main objectives of these surveys were to question users with regard to which library services and resources users are aware of, which ones are used by what groups, how they are used, and what value is placed upon them; and to make recommendations for intermediate and long range planning. Using a standard university computer sampling program, surveys were distributed to 1,386 students, or 18% of the total 7,596 full-time equivalent student enrollment. Six hundred and eighty-six (49%) of the student surveys were returned. Each of the 524 faculty/academic staff received a faculty survey, of which 224 (43%) were returned. Significant findings from both groups revealed a high level of satisfaction with existing library services, resources, and staff. Recommendations for further study and/or implementation were identified from the results of both surveys. Part I of the study is a summary; Part II represents findings, conclusions, and recommendations based upon an analysis of the student survey; and Part III reports the results of the similar (but not identical) faculty/academic staff survey. (DMC).

512,962
ED-246 909 Not available NTIS
United Nations Educational, Scientific and Cultural Organization, Paris (France). General Information Programme.
CCF: The Common Communication Format,
P. Simmons, and A. Hopkinson. 1984, 183p PGI-84/WS/4
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

The purpose of the Common Communication Format (CCF) is to provide a detailed and structured method for recording a number of mandatory and optional data elements in a computer-readable bibliographic record for exchange purposes between two or more computer-based systems. However, it can also be useful within non-computerized bibliographic systems. Not designed to be used as a manual by staff responsible for coding or otherwise preparing bibliographic descriptions for input to a computer system, this document is meant to be a specification to assist systems designers in devising local procedures and computer programs so that they can exchange files in either direction with other organizations which may use the CCF. It is neither complete nor final, as much work remains to be done to test the current version of the CCF and to provide assistance in its implementation. It is also expected that the scope of the CCF data elements, now confined to descriptions of monographs and serial publications, will be expanded. This manual is divided into five parts: introduction, use of the format, data elements, codes used in the data elements, and examples of complete records. (DMC).

512,963
ED-246 911 Not available NTIS
American Library Association, Washington, DC.
Legislative Report of the ALA Washington Office, January-June 1984.
1984, 35p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Nationwide interest in restoring excellence to education continued into 1984, but made no dent in the Reagan administration's determination to eliminate federal library programs. Congress is again resisting this third year of zero budgets, despite efforts to contain soaring federal deficits. Few issues pending in this second session of the 98th Congress have been resolved. Library Services and Construction Act reauthorization appears likely to make it through the process, but efforts in the House to get a head start on Higher Education Act reauthorization have been dropped. Measures to provide a mass book deacidification facility for the Library of Congress, extend the Medical Library Assistance Act, and give independence to the National Archives are pending. There are continuing efforts to restrict, directly or indirectly, access to government information through administration policy in such areas as contracting out of federal activities, federal information management, lobbying by nonprofit organizations, information relating to national security, paperwork reduction, pay equity, and standards for federal librarians. Telecommunications access charges and divestiture related tariffs were, for the most part, postponed and there were congressional efforts to mitigate the impact of pending increases in the cost of private leased lines used by libraries to transmit bibliographic data. A funding table and status of legislation chart are appended. (DMC).

512,964
ED-246 913 Not available NTIS
Patron Presence during the Online Search: Attitudes of University Librarians,
K. Salomon, and C. Burgess. Jun 84, 8p
Paper presented at the Annual Conference of the American Library Association (Dallas, TX, June 23-27, 1984). Contains small print.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

A controversial issue involving online computer searching is the effect of patron presence during the computer search. The purpose of this research was to determine the attitudes of university librarians toward patron presence. A survey was used to explore variables related to the search process and searcher characteristics. Also considered was the degree to which a searcher believes that patron presence contributes to searcher nervousness. Three-hundred eighty online searchers, representing 85 libraries, were willing to participate. Of the 201 surveys (52.9%) returned, 198 were usable. Eleven Likert scale items were used to estimate attitudes along a five-point continuum of 'strongly agree' to 'strongly disagree.' The relationship of searcher experience and the attitudes reflected in the Likert scale items were measured by four additional variables. Overall, 77% of the searchers indicated a preference for patron presence during the computer search. Empirical research is necessary in order to understand how the variables of presence, nervousness, and ability to refine the search are related. The conclusions about searcher attitudes and beliefs about the search process resulting from this study can provide direction to research that focuses on the actual search process, and the dynamics of the searcher-patron relationship. (DMC).

512,965
ED-246 915 Not available NTIS
American Library Association, Chicago, IL.
Realities: Educational Reform in a Learning Society. A Statement by the American Library Association Task Force on Excellence in Education.
1984, 17p
Document is printed in colored ink or colored paper.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Because the vitality of libraries as educational agencies depends on wise actions by public decision makers and others who provide resources to educational institutions, the American Library Association has identified four realities for effective educational reform within a learning society: (1) learning begins before schooling, (2) good schools require good school libraries, (3) people in a learning society need libraries throughout their lives, and (4) public support of libraries is an investment in people and communities. Much public attention is focused on recommendations for changes in elementary and secondary schools. Yet, as 'A Nation at Risk' clearly states, proposals for educational reform must recognize the need for lifelong learning. Libraries are an essential part of lifelong learning, and all people in a learning society deserve access to good library service. Within the last year more than half the state legislatures have increased state aid for schools, and over half have raised high school graduation requirements. States and communities have established uncounted commissions, committees, and task forces to examine and improve their schools. Attention to elementary and secondary schools constitutes an important beginning. However, with few exceptions, recognition of the value of libraries is missing from these educational reform efforts. Now it is essential to recognize these four realities of educational reform and act on them. (DMC).

512,966
ED-246 916 Not available NTIS
Theoretical Organization of Information: Research Review of a Sample of ERIC's Innovation Diffusion and Planned Change Documents Organized According to the Configuration, Linkage, Environment, Resource (CLER) Model of Planned Change,
G. Brown. May 84, 141p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This document is a review of research on the subject of innovation diffusion and planned change, organized according to a theoretical model. The organizational scheme used is derived from Bhola's Configurational, Linkages, Environmental, and Resources (CLER) model of planned change. Conventional reviews of research identify accomplishments in knowledge production, but are not as effective in promoting knowledge utilization by end-users. They are often organized according to descriptive or topical taxonomies and the terms and descriptors used in cataloging are not always precise. The findings of a study conducted by the author (1984) indicated that a theoretical model, here the CLER model, can provide a scheme for the organization of information that increases knowledge utilization. The materials reviewed consist of 50 ERIC documents selected from 1982 issues of 'Resources in Education' for their diversity of topics, brevity, and pertinence to planned change. A total of 52 categories were generated from the CLER model (no relevant information was found for 11 of these categories). Of primary interest is the efficacy of theoretically organized information; the review of research is a secondary objective. Information devised and ordered using a theoretical model is not presented as a panacea to the numerous problems in knowledge utilization. Rather, it is suggested that the theoretical organization of information can be a powerful tool for increasing knowledge utilization. (DMC).

512,967
ED-246 917 Not available NTIS
Academic Freedom and Faculty Status for Academic Librarians: A Bibliographical Essay,
P. O. Rice. Aug 84, 18p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

The purpose of this essay is to review documents from library literature which base their arguments in favor of academic status for librarians in whole or in part on the concept of academic freedom. Thirteen such items dating from 1956 to 1975 are identified and discussed. The essay is followed by a discussion of the actual meaning of the concept of academic freedom and the issue of tenure for academic librarians. (DMC).

512,968
ED-246 919 Not available NTIS
ERIC Processing and Reference Facility, Bethesda, MD.
ERIC Clearinghouse Publications, 1983. An Annotated Bibliography of Information Analysis Products and Other Major Publications of the ERIC Clearinghouses, January-December 1983,
C. R. Weller, and T. Brandhorst. Jun 84, 52p
Contract 400-81-0003
For related document, see ED 237 098.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

A broad range of education-related topics are addressed in this annotated bibliography, which presents citations and abstracts for 117 publications produced by the 16 ERIC Clearinghouses in 1983. An introduction explains the ERIC system, clearinghouse publications, the organization of this bibliography, and the availability of clearinghouse publications. A statistical summary by year (1968-1983) shows the number of documents included for each clearinghouse in the series of which this bibliography is the most recent. Document resumes are provided from the following clearinghouses: (1) Adult, Career, and Vocational Education; (2) Counseling and Personnel Services; (3) Reading and Communication Skills; (4) Educational Management; (5) Handicapped and Gifted Children; (6) Languages and Linguistics; (7) Higher Education; (8) Information Resources; (9) Junior Colleges; (10) Elementary and Early Childhood Education; (11) Rural Education and Small Schools; (12) Science, Mathematics and Environmental Education; (13) Social Studies/Social Science Education; (14) Teacher Education; (15) Tests, Measurement, and Evaluation; and (16) Urban Education. A listing of ERIC Digests, i.e., short user-oriented reference sheets formerly called Fact Sheets or Short Reports, is also provided. (DMC).

512,969
ED-246 920 Not available NTIS
American Library Association, Chicago, IL.

Libraries and the Learning Society. Papers in Response to 'A Nation at Risk.'.
1984, 152p ISBN-0-8389-3313-0
For the final project report, see ED 243 885. The five issue papers are available individually as ED 243 886-890.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

These issue papers were prepared for a series of seminars that were sponsored by the U.S. Department of Education's Center for Libraries and Education Improvement, held in part of the Libraries and the Learning Society Project. These seminars brought together librarians, educators, library users, and others to focus on the most effective role for libraries in a learning society. The seminar papers were used as the basis for discussions that were summarized in the final report on the project ('Alliance for Excellence'). This document contains a foreword by Joseph Shubert; 'School Library Media Programs and Their Role in Schooling: An AASL (American Association of School Librarians) Response to the 'Nation at Risk Report''; and the five seminar papers--''Stemming the Tide' of Mediocrity: The Academic Library Response,' Richard M. Dougherty; 'Vision to Purpose to Power: A Quest for Excellence in the Education of Library and Information Science Professionals,' Jane Anne Hannigan; 'Learning at Risk: School Library Media Programs in an Information World,' James W. Liesener; 'Public Libraries and Excellence: The Public Library Response to 'A Nation at Risk',' Douglas L. Zweizig; and 'Libraries and the Learning Society: Relationships and Linkages among Libraries,' Peggy Sullivan. (DMC).

512,970
HRP-0906087/2/GAR PC **A04**/MF **A01**
Arizona Center for Occupational Safety and Health, Tucson.
Workers' Compensation.
Project module,
D. Foster. Dec 82, 54p
Contract PHS-HRA-232-78-0191

The purpose of workers' compensation is to provide monetary support to workers, their families, and dependents in the case of injuries or illnesses which arise out of employment or occur during employment. Specific functions of the system are: (1) to provide medical treatment for injured workers, (2) to furnish a portion of workers' wages when they are temporarily disabled, (3) to provide cash compensation to the worker who has been permanently disabled, (4) to rehabilitate, physically and vocationally, the severely disabled worker, (5) to award death benefits to dependents in case of fatality, and (6) to pay the costs of special medical examinations (14).

512,971
NUREG/CR-3371-V3/GAR PC **A99**/MF **E04**
General Physics Corp., Columbia, MD.
Task Analysis of Nuclear Power Plant Control Room Crews. Volume 3. Task Data Forms.
Final rept. Dec 81-Jun 83,
D. Burgy, C. Lempges, A. Miller, L. Schroeder, and H. Van Cott. Dec 84, 901p GP-R-221020-VOL-3
See also NUREG/CR-3371-V2, and NUREG/CR-3371-V4. Prepared in cooperation with BioTechnology, Inc., Falls Church, VA.

A task analysis of nuclear power plant control room crews was performed by General Physics Corporation and BioTechnology, Inc. for the Office of Nuclear Regulatory Research, US NRC. The task analysis methodology used in the project is discussed and compared with traditional task analysis and job analysis methods. The objective of the project was to conduct a crew task analysis that would provide data for evaluating six areas: (1) human engineering design of control rooms, (2) the numbers and types of control room operators needed with requisite skills and knowledges, (3) operator qualification and training requirements, (4) normal, off-normal, and emergency operating procedures, (5) job performance aids, and (6) communications. A generic structural framework for assembling the large task data base was employed from observations and videotaping of crew behaviors during 44 operating sequences conducted at 8 power plant sites. The results of the data collection effort were compiled in a computerized task database (SEEK). Volumes 3 and 4 present the Task Data Forms that resulted from the project.

512,972
NUREG/CR-3371-V4/GAR PC **A99**/MF **E04**
General Physics Corp., Columbia, MD.
Task Analysis of Nuclear Power Plant Control Room Crews. Volume 4. Task Data Forms.
Final rept. Dec 81-Jun 83,
D. Burgy, C. Lempges, A. Miller, L. Schroeder, and H. Van Cott. Dec 84, 949p GP-R-221020-VOL-4
See also NUREG/CR-3371-V3. Prepared in cooperation with BioTechnology Inc., Falls Church, VA.

A task analysis of nuclear power plant control room crews was performed. The task analysis methodology used in the project is discussed and compared with traditional task analysis and job analysis methods. Volumes present the Task Data Forms that resulted from the project.

512,973
PB85-135051/GAR PC **A02**/MF **A01**
University of Southern California, Los Angeles. Inst. for Marine and Coastal Studies.
USC (University of Southern California) Sea Grant Program Directory, 1984-85.
K. Charest. Oct 84, 22p USCSG-SR-04-84
Grant NA-81AA-D-00094

The University of Southern California has demonstrated excellence in marine research and education for more than 70 years. A vital part of this marine-related research and education is the USC Sea Grant Program, a part of the Institute for Marine and Coastal Studies. Since 1970, Sea Grant activities have cut across expertise and resources to bear on important problems and opportunities associated with the Southern California coastal zone. For example, this year's program includes research projects by faculty and staff members representing five university departments and schools.

512,974
PB85-135291/GAR PC **A14**/MF **A01**
Checchi and Co., Washington, DC.
Mauritania: Evaluation of the Formal Education System in Relation to Development Objectives.
Rural assessment and manpower survey.
1980, 317p AID-PN-AAM-178
Contract AID/afr-C-1489
Prepared in cooperation with Berger (Louis) International, Inc., East Orange, NJ., and Action Programs International, Santa Monica, CA.

This assessment finds that serious deficiencies in almost all aspects of Mauritania's educational system render it incapable of meeting the nation's education and training needs. To provide a framework for analyzing the educational system, the paper first outlines the three national economic and social development plans implemented since 1963. Next, the organizational and administrative structures of the public and private educational systems are examined. A detailed analysis of the educational system by level and type of education - which includes data on program structures, student enrollments, teaching staffs, and educational financing and budgets - is then presented. A final section presents conclusions regarding elementary, secondary, vocational and technical, pedagogical, and higher education.

512,975
PB85-135994/GAR PC **A04**/MF **A01**
Checchi and Co., Washington, DC.
Education as a Development Tool: Mauritania.
Rural assessment and manpower survey.
Mar 81, 61p AID-PN-AAM-187
Contract AID/afr-C-1489
Prepared in cooperation with Berger (Louis) International, Inc., East Orange, NJ., and Action Programs International, Santa Monica, CA.

Mauritania's educational system, with its focus on the urban elite and modern industry, has left the rural masses without the benefits of development and has led to the decline of rural communities. To help redress this situation, this report outlines an educational strategy that is aimed at all segments of the population, embraces both formal and non-formal elements, and is directed at both national and local development. An initial section treats the objectives and content of basic education. Emphasis is placed on functional literacy and acquiring the knowledge needed for productive work and access to higher education and on replacing a curriculum glorifying Western society, urban life, and non-manual labor by one stressing the importance of rural development and awareness of the rural condition. Succeeding sections are devoted to reforming secondary, professional, and higher education, and teacher training. The role to be played by educational institutions at every level is delineated, as are means for integrating the entire educational system. Appended are charts in English and French describing the proposed educational structure.

512,976
PB85-136349/GAR PC **A06**/MF **A01**
Agency for International Development, Washington, DC.
Radio Correspondence Education in Kenya.
Project impact evaluation rept. no. 37,
W. L. Eilers, P. P. Layne, D. L. Rhoad, and C. E. Robins. Aug 82, 124p AID-PN-AAJ-620

If there was a flaw in the Kenya Radio Correspondence Project, it was that it succeeded. When established with AID funding in 1967 in this East African country of 16 million, the project was designed to upgrade the qualifications of primary school teachers through correspondence courses and radio instruction. An overwhelming majority of the 12,000 teachers trained through this method passed national examinations and qualified for promotions and higher salaries. Ironically, the impact of the higher salaries upon Kenya's already substantial and rising education budget prompted the government to abandon the automatic promotion policy which had motivated many of the teachers to sign up and pay for radio correspondence instruction. Enrollments plummeted, jeopardizing the financial viability of the Kenya institution which U.S. technical assistance helped to found. Despite this serious setback, the AID impact evaluation team which visited Kenya in late 1980 learned that the 17-year-old project not only survived, but has been selected to serve new and significant national educational tasks.

512,977
PB85-136737/GAR PC **A06**/MF **A01**
Booz-Allen and Hamilton, Inc., Bethesda, MD.
Evaluation of TJTC (Targeted Jobs Tax Credit) Telephone Vouchering Techniques.
Final rept.
1 Feb 84, 108p DLETA-20-24-82-10
Contract DL-20-24-82-10

This report presents the results of a study of the Targeted Jobs Tax Credit (TJTC) telephone vouchering process. Telephone vouchering was implemented by the Florida State Employment Security Agency (SESA) as an alternative to vouchering processes relying on face-to-face interviews. It was implemented primarily to reduce costs to program participants (TJTC applicant, employer, SESA). This study was conducted to determine whether costs were reduced and to identify the impact of telephone vouchering on effectiveness and program integrity.

512,978
PB85-136984/GAR PC **A03**/MF **A01**
Georgia Inst. of Tech., Atlanta. Coll. of Architecture.
Transit Operations Institute: A Management Development Seminar for Women in the Transit Industry. Volume 1.
Final rept. Aug 83-Aug 84,
C. L. Ross. Aug 84, 31p UMTA-GA-11-0015-84-1
See also PB85-136992.

This report outlines the results of a one-week Institute designed to provide professional growth and enhancement for women currently employed in the transit industry. Georgia Institute of Technology joined with the Metropolitan Atlanta Rapid Transit Authority (MARTA) to provide an overview of the transit operations side of the industry. The intent was to provide a reasonable representation of the range of functions which are needed and the skills and backgrounds women must claim in order to perform these functions. The Institute combined on-site tours, pre-tour briefings, panel discussions, lectures and a variety of experiential opportunities in an effort to respond to the needs of women for technical/operational training in the transit industry.

512,979
PB85-136992/GAR PC **A07**/MF **A01**
Georgia Inst. of Tech., Atlanta. Coll. of Architecture.
Transit Operations Institute: A Management Development Seminar for Women in the Transit Industry. Volume 2.
Final rept. Aug 83-Aug 84,
C. L. Ross. Aug 84, 130p UMTA-GA-11-0015-84-2
See also PB85-136984.

This report consists of selected materials from the notebook distributed to participants of the 'Transit Operations Institute: A Management Development Seminar for Women in the Transit Industry', a one-week workshop designed to provide professional growth and enhancement for women currently employed in the transit industry. This volume, Volume II, consists primarily of handouts which served as the basis for discussion by technical personnel. The purpose of the seminar was to increase the number of women prepared to assume positions of major responsibility within the industry.

512,980
PB85-137990/GAR PC A07/MF A01
Public Research Inst., Alexandria, VA.
Utilization of Men and Women in Science and Engineering Occupations: Task and Earning Comparability.
A. O. Quester. Jul 84, 126p CRC-524
Grant NSF-SRS82-13881

Differences in earnings of males and females have been attributed to differences in personal characteristics, fields of specialization, and years of professional experience. This study focuses on scientists and engineers, seeking to determine the extent to which differences in measured characteristics explain differences in earnings. In addition to documenting gender differences in the earnings of new entrants and experienced personnel, the study investigates gender differences in the choice of college major and in the transition from school to work.

512,981
PB85-138519/GAR PC A05/MF A01
MACRO Systems, Inc., Silver Spring, MD.
Study of the Targeted Jobs Tax Credit Summer Youth Experience.
Final rept.,
P. Richardson. Apr 84, 80p R-1347-3
Contract DL-20-24-82-11
Supersedes PB84-199058.

The objective of this study was to gather information on how the 1983 Targeted Jobs Tax Credit (TJTC) program for summer youth operated, the extent to which the tax credit was used, what types of jobs were filled, the implementation problems encountered, and efforts of the Job Service and other organizations to promote usage of the program. As part of the study, site visits were made to 18 jurisdictions.

512,982
PB85-138857/GAR PC A02/MF A01
Virginia Polytechnic Inst. and State Univ., Blacksburg.
Influence of Financial Incentive Programs on Employee Performance and Organizational Productivity Within the Mass Transit Industry - Executive Summary.
Final rept.,
K. D. Scott, and D. L. Deadrick. Nov 84, 12p UMTA-VA-11-0013-84-1
Grant DOT-UMTA-VA-11-0013
See also PB85-138865.
Also available in set of 3 reports PC E99, PB85-138840.

This research report examines the influence that financial incentive programs (FIPs) have on individual employee performance and on organizational productivity. The report also focuses on the extent to which financial incentives are currently used in urban mass transit agencies and the effectiveness of such programs in the transit environment. The research findings are presented in three major sections: (1) a selective review of the social science literature regarding theoretical and practical aspects of financial incentives; (2) an overview of incentive practices in both the private and public sectors; and (3) our survey of transit agencies regarding the types and outcomes of FIPs being used. The report describes the major types of FIPs found in the literature in terms of the program objectives, the program operations, the empirical research evaluations, and the potential strengths and weaknesses. The transit survey findings are analyzed in terms of what types of FIPs are most frequently used, how long those programs have been in place, and how the programs are evaluated. Recommendations concerning the selection and use of FIPs within the transit environment are made.

512,983
PB85-138865/GAR PC A04/MF A01
Virginia Polytechnic Inst. and State Univ., Blacksburg.
Influence of Financial Incentive Programs on Employee Performance and Organizational Productivity Within the Mass Transit Industry.
Final rept.,
K. D. Scott, and D. L. Deadrick. Nov 84, 66p UMTA-VA-11-0013-84-2
Grant DOT-UMTA-VA-11-0013
See also PB85-138857, and PB85-138873.
Also available in set of 3 reports PC E99, PB85-138840.

This research report examines the influence that financial incentive programs (FIPs) have on individual employee performance and on organizational productivity. The report also focuses on the extent to which financial incentives are currently used in urban mass transit agencies and the effectiveness of such programs in the transit environment. The research findings are presented in three major sections: (1) a selective review of the social science literature regarding theoretical and practical aspects of financial incentives; (2) an overview of incentive practices in both the private and public sectors; and (3) our survey of transit agencies regarding the types and outcomes of FIPs being used.

512,984
PB85-138873/GAR PC A05/MF A01
Virginia Polytechnic Inst. and State Univ., Blacksburg.
Influence of Financial Incentive Programs on Employee Performance and Organizational Productivity Within the Mass Transit Industry - Appendices.
Final rept.,
K. D. Scott, and D. L. Deadrick. Nov 84, 76p UMTA-VA-11-0013-84-3
Grant DOT-UMTA-VA-11-0013
See also PB85-138865.
Also available in set of 3 reports PC E99, PB85-138840.

This research report examines the influence that financial incentive programs (FIPs) have on individual employee performance and on organizational productivity. The report also focuses on the extent to which financial incentives are currently used in urban mass transit agencies and the effectiveness of such programs in the transit environment. The research findings are presented in three major sections: (1) a selective review of the social science literature regarding theoretical and practical aspects of financial incentives; (2) an overview of incentive practices in both the private and public sectors; and (3) our survey of transit agencies regarding the types and outcomes of FIPs being used.

512,985
PB85-854131/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Job Analysis Methodology. 1970-January 1985 (Citations from the NTIS Data Base).
Rept. for 1970-Jan 85.
Jan 85, 329p
Supersedes PB83-805770.

This bibliography contains citations concerning methodologies utilized in the analysis and evaluation of tasks. Topics include task inventories and assignment criteria, evaluations of job responsibilities, manpower requirements, and various aspects of job education and training. Emphasis is placed on studies performed in the health care field. Some attention is also given to military applications. (This updated bibliography contains 316 citations, 18 of which are new entries to the previous edition.)

512,986
SHR-0011834/GAR PC A08/MF A01
Office of Human Development Services, Washington, DC.
Comparative Study of the Functions of the Case Manager in Multipurpose, Comprehensive, and Categorical Programs.
1977, 169p

Addressed in this study are questions regarding case management and the patterns of service activities, factors having an impact on the case manager's performance, and the operational aspects of case management systems. Many factors have a significant impact on the development of operational case management components. The task of brokering for external resources creates a broader, more authoritative role for workers to operate with more flexibility and autonomy. Feedback is essential as a mechanism for timely evaluation and assessment. Research has pinpointed issues concerning the type of management information systems used in case management: if a high level of discretionary authority and responsibility is granted to case managers operating as broker - advocates at the line level, there will be a corresponding organizational need for accountability. The case management model implies a different conception of worker activity from that of traditional models of service delivery. The case management component has a mandate to negotiate for the external resources on behalf of individual clients or client groups. Case managers traverse the periphery of many organizations. The necessity to develop systems that can quickly and efficiently represent and communicate about the interorganizational activities is one operational consequence of this model. A nine - page reference list and 16 tables are provided.

5J. Psychology (Individual and Group Behavior)

512,987
AD-A148 718/0/GAR PC A07/MF A01
Ohio State Univ. Research Foundation, Columbus.
Optical Flow and Texture Variables Useful in Detecting Decelerating and Accelerating Self-Motion.
Interim paper. Apr-Dec 83,
D. H. Owen. Nov 84, 150p AFHRL-TP-84-4
Contract F33615-83-K-0038

The two experiments presented in this report are part of a program that has the goals of mathematically isolating global optical candidates for self-motion information and of empirically assessing their usefulness. The first experiment tested sensitivity to loss in speed and demonstrated that (a) increasing fractional loss was easier to detect than invariant fractional loss, (b) the optimal optical texture density was one ground unit per eyeheight (altitude unit), (c) optimal combinations of flow deceleration and flow rate were found, but differ slightly with level of fractional loss in flow rate, and (d) males were more accurate than females. The second experiment separated flow-rate and edge-rate variables and tested for sensitivity to gain in speed with the following results: (a) sensitivity to flow-rate gain was independent of sensitivity to edge-rate gain, (b) the influences of initial flow rate and initial edge rate were independent, (C) sensitivity to edge-rate gain increased with event duration, (d) illusory edge-rate information was more salient than veridical flow-rate information, and (e) some individuals were more flow-rate dependent, some more edge-rate dependent, but no sex difference was observed. Theoretical implications for the ecological approach to the study of perception and for the study of information specifying mechanisms are discussed.

512,988
AD-A148 809/7/GAR PC A05/MF A01
EEG Systems Lab., San Francisco, CA.
Neurocognitive Pattern Analysis of an Auditory and Visual Numeric Motor Control Task. Part 1. Development of Methods.
Final rept. 22 Feb 82-30 Sep 84,
A. S. Gevins, S. L. Bressler, B. A. Cutillo, J. C. Doyle, and N. H. Morgan. Oct 84, 96p AFOSR-TR-84-1107
Contract F49620-82-K-0006

New advances in understanding human neurocognitive functions must come from new technologies for measuring split-second changes in event related electrical and magnetic fields which may soon complement the anatomical information produced by CT and NMR brain scans and the static metabolic images of PET scans. As a contribution to this effort, the EEGSL is developing the method of Neurocognitive Pattern (NCP) Analysis to study both simple and complex cognitive tasks. A number of previous findings suggest that neither strictly localizationist (single equivalent dipole) nor equipotentialist (hologram) models of neurocognitive processing are realistic. Rather, a more appropriate model seems to be a distributed computational network in which there is continuous communication between many parallel, specialized processing elements. In order to better measure and model these complex processes, the initial thirty months of this project focused on developing experimental tasks and advanced recording and analysis technologies.

512,989
ED-246 865 Not available NTIS
American Broadcasting Co., New York.
Sexuality, Television and Broadcast Standards,
M. S. Heller. 1984, 43p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This monograph provides a rationale for contemporary guidelines for the television and broadcast network management of sexual content in proposed progam materials. Beginning with a brief outline of the professional practices and responsibilities of broadcast standards editors, it then explores the relationships between sexual development, attitudes toward shame and nudity, and their implications for contemporary editorial decision-making. Examples of sexual themes that illustrate broadcast standards concerns about the balanced portrayal of issues and about the prospects, risks, and consequences of sexual behavior are examined, including pre-marital and extra-marital sex, teenage sex portrayals, contraception and abortion, prostitution, sexual violence and rape, homosexuality, incest, divorce and separation, and sex, gender, and sexism. A rationale is offered for the use of standardized sexual decision points, which assure the editor, network, and viewer alike that each content item has been specifically and uniformly subjected to a uniform, rational method of scrutiny. A 37-item bibliography is included. (Author/LMM).

512,990
ED-246 881 Not available NTIS
Learning from Computers: Theoretical Problems,
R. E. Clark. Apr 84, 12p
Paper presented at the Annual Meeting of the American Educational Research Association (New Orleans, LA, April 23-27, 1984).
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

A review of computer assisted instruction research and recent meta-analytical reports suggests that all research on the learning benefits of the instructional uses of computers should be halted until there is a plausible reason to expect that computers are instrumental in learning, since all existing evidence indicates that computers do not yield learning benefits. Evidence to the contrary is subject to compelling rival hypotheses concerning novelty effects and instructional method/content effects on learning. A review of recent symbol system theories and existing evidence suggests that, while cognitive skills can be cultivated with computer-related symbol systems, the effects are already available from other mediums. Computers are useful in delivering instruction and may influence instructional cost or distribution equity, but they should not be expected to contribute any unique effects to learning. Research that compares computers with other instructional media should be deemphasized, and caution should be exercised with media attribute research, as it does not translate to prescriptive theories. Instead, focus should be on research that could contribute to both descriptive and prescriptive instructional theory. Ten references are listed. (Author/LMM).

512,991
ED-246 918 Not available NTIS
Effects of Two Methods of Course-Related Library Instruction on Undergraduates' Library Skills and Attitudes,
E. C. Meehan-Black. 1981, 27p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

The effectiveness of an experientially designed library instruction presentation was compared to a lecture format by assessing the library skills and attitudes toward libraries and librarians of 50 freshman and sophomore students enrolled in educational psychology and human development courses before and after instruction. One group of undergraduates received an experiential/workbook lesson, another received a lecture, and a control group received no instruction. Instruments developed for this study were a library skills test and an attitude survey composed of five factors: correct use of the library, interest in scholarly work, receptiveness to library instruction/future usefulness, attitudes toward librarians, and comfortable use of the library. Results indicated that the experiential format was more effective in producing an increase in library skills scores at the second measurement (after instruction) than the lecture method. But both of the groups receiving instruction produced higher library skills test scores at the third measurement (end of term) than the no-instruction control group. A significant relationship was also found between initial attitudes toward librarians and later library skills as well as between initial skills and later attitudes toward librarians. (Author/DMC).

512,992
HRP-0906096/3/GAR PC **A02**/MF **A01**
Arizona Center for Occupational Safety and Health, Tucson.
Instructional Guide to Alcohol and the Workplace,
K. M. Rest, S. Levey, and J. R. Hall. Dec 82, 11p
Contract PHS-HRA-232-81-0047

This videotape focuses on one factor that is frequently overlooked in the discussion of alcoholism - the workplace. Not only is it of etiological significance, but the workplace is also a locus for problem identification, intervention, and prevention. It is important for viewers to realize that this videotape deals almost exclusively with the reciprocal relationship between the workplace and alcohol abuse. It provides some background, suggestions, caveats, and encouragement for primary care physicians' utilization of the workplace as a resource in dealing with patients with incipient or existent alcohol problems.

512,993
NUREG/CR-3518-V2/GAR PC **A08**/MF **A01**
Brookhaven National Lab., Upton, NY.
SLIM-MAUD: An Approach to Assessing Human Error Probabilities Using Structured Expert Judgment. Volume 2. Detailed Analysis of the Technical Issues,
D. E. Embrey, P. Humphreys, E. A. Rosa, B. Kirwan, and K. Rea. Jul 84, 162p BNL-NUREG-51716-V2
Contract DE-AC02-76CH00016
See also NUREG/CR-3518-V1. Prepared in cooperation with Human Reliability Associates Ltd., Parbold (England), and London School of Economics and Political Science (England).

This two-volume report presents the procedures and analyses performed in developing an approach for structuring expert judgments to estimate human error probabilities. Volume II provides a more detailed analysis of the technical issues underlying the approach. Contents: Technical analysis of the success likelihood index methodology (SLIM) and its implementation through multi-attribute utility decomposition (MAUD); Phases I and II of the SLIM research program; Stand-alone procedures for implementing SLIM with MAUD; Phase IV research--test plan.

512,994
N85-12479/0/GAR PC **A07**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Patterns of Behavior in Lodgings Exposed to Traffic Noise.
J. Lambert, F. Simonnet, and M. Vallet. Nov 84, 136p NAS 1.15:77750, IRT-47, NASA-TM-77750
Contract NASW-3542
Transl. into English of "Comportements dans l'Habitat Soumis au Bruit de Circulation" Rept. Irt-47, Sep. 1980 145 p. Transl. by Scientific Translation Service, Santa Barbara, CA. Original Document Prep. by Inst. De Recherche des Transports, Arcueil, France.

Threshold values for public services interferent on the attenuation to noise nuisance were defined. Daily life at home was described and collected on the use of residences, the effects of noise on health and sleep, and the incidence of running away from home. A correlation was made with the equipment and noise insulation of homes. It is shown that there are behavior patterns in the modification of considerable manner in the way of life for people who live in apartments and in individual houses, above 66 dB during daytime.

5K. Sociology

512,995
ED-246 889 Not available NTIS
Television Viewing as a Dominant Activity of Childhood: A Suggestion for a Developmental Effects Theory,
B. Watkins. May 84, 20p
Paper presented at the Annual Meeting of the International Communication Association (San Francisco, CA, May 1984).
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Research on children and media has generally focused on the negative impact of media on developing minds. However, a theoretical framework is proposed for thinking about the role of television for American children from a developmental perspective. Instead of focusing on television's effects, television viewing can be examined as is any other childhood activity--as a constant series of interactions with social, cultural, and personal information that lead to a child becoming a functioning member of society. It is one activity, not necessarily the major activity, of childhood. However, the set of interactions with television can be examined as a dominant activity of American childhood and adolescence. (A dominant activity, long a theme in Soviet cognitive psychology, is composed of a set of tasks that are common to most children in a particular culture.) Television qualifies as a dominant activity because most American children participate in television viewing; there is a consistency in the social values it portrays; considerable effort is involved in understanding its symbol systems; and because certain sets of behavioral or cognitive outcomes have been linked to television viewing. A four-page reference list is included. (Author/LMM).

512,996
PB85-130037/GAR PC **A03**/MF **A01**
International Bank for Reconstruction and Development, Washington, DC. Economic Development Inst.
Savings and Credit Arrangements in the Informal Financial Market of Developing Countries: Observations from Sri Lanka.
Discussion paper,
F. J. A. Bouman. Sep 81, 34p DP-4, AID-PN-AAJ-967
Contract AID/TA-BMA-7
Prepared in cooperation with Ohio State Univ., Columbus. Presented at Colloquium on Rural Finance, September 1-3, 1981, Washington, DC.

Given the growing consensus that the institutional financial sector has failed to meet the needs of the rural poor, the longstanding systems of informal saving and borrowing found throughout the developing world deserve further attention and support. Toward this end, this paper analyzes informal savings and credit arrangements in rural Sri Lanka. Refuting conventional wisdom, the author opens by arguing that the poor do indeed save - in cash, goods, and debt claims; with pawnbrokers, merchants, and money lenders; and at home and in groups. Thrift is natural among those who must cope with irregular cash flows. The author emphasizes group saving - through pilgrimage societies, saving clubs, death aid societies, and rotating savings and credit associations (ROSCA's or cheetus) - as having several advantages over saving individually. Such institutions help avoid embarrassing claims of relatives and friends, are safe depositories, enhance the discipline to save, and provide members with a variety of economic benefits. Although seldom paying interest, savings groups are the preferred vehicle because they are accessible, flexible, familiar, and make loans readily. The operation and membership of cheetus, the most popular form of group saving, are discussed at length.

512,997
PB85-132975/GAR PC **A04**/MF **A01**
Ministere du Developpement Rural, Niamey (Niger).
Introduction a l'Histoire des Wodaabe du Niger (Introduction to the History of the Wodaabe).
Discussion paper,
A. B. Maliki. Mar 82, 52p DP-3, AID-PN-AAL-114
Text in French.

Contrary to the popular impression that the Wodaabe arrived at their present Nigerien home as the result of irrational and chaotic migrations, this study reveals that each movement was based on a need to confront precise political, social, and physical threats to their survival as a tribe. Migration, whether urgent and rapid or more gradual, was especially important during the extremely unstable period in the Sudan at the end of the nineteenth century. A wide array of changes in

social structures and interrelationships with surrounding and invading peoples left migration to ever more marginal lands as the only alternative for the Wodaabe's survival. As the tribe moved in various waves into Niger, internal tribal organization was forced to change in order to adapt to constantly changing environments and new subsistence patterns and as part of the process of Islamization. The ancestral family deferred its tribal organizing role to Islamic laws of organization and identity. Today, Wodaabe tribal structure and functions are a conglomeration of adapted patterns which is still in flux.

512,998
PB85-132983/GAR PC A02/MF A01
University of the West Indies, Kingston (Jamaica). Dept. of Social and Preventive Medicine.
Infant Mortality Rate in Three Parishes of Western Jamaica, 1960.
P. Desai, B. F. Hanna, B. F. Melville, and B. A. Wint.
1982, 15p AID-PN-AAL-165
Contract AID-532-79-12
Prepared in cooperation with Ministry of Health, Kingston (Jamaica).

This study sought to establish the infant mortality rates for the parishes of St. James, Hanover, and Trelawny during 1960. Information on infant deaths in 1960 was sought from a variety of sources, as was information on live births in the same year. Fewer than half of all infant deaths appeared to have been registered in 1960 in the parishes studied. The infant mortality rate for 1960 was 27 per thousand live births for the three parishes combined. The apparent under-registration of infant deaths is discussed.

512,999
PB85-133700/GAR PC A03/MF A01
International Statistical Inst., Voorburg (Netherlands).
Infant Mortality in Kenya: Evidence from the Kenya Fertility Survey.
Scientific rept. no. 32,
F. L. Mott. Aug 82, 29p AID-PN-AAL-618
Prepared in cooperation with World Fertility Survey, London (England).

Recent increases in Kenya's population growth rate - one of the world's highest - are due more to declining infant mortality than to rising fertility. This paper examines infant mortality in Kenya based on the 1978 Kenya Fertility Survey and argues that despite declining mortality, much still needs to be done in the areas of health and nutrition. After briefly reviewing African data on child and infant mortality and historical data on infant mortality in Kenya, the author analyzes long-term and current trends in Kenya's infant mortality. Next, past and present differentials in infant and neonatal mortality are examined in relation to birth order, child's sex, education, location (urban, rural, and by region), and type of marriage (monogamy versus polygamy). Finally, the author performs a multivariate analysis of the above trends and differentials.

513,000
PB85-134955/GAR PC A03/MF A01
Carnegie-Mellon Univ., Pittsburgh, PA.
Effects of Imprisonment on Criminal Behavior (Years 01,02,03) and Analysis and Characterization of Criminal Careers (Years 04,05).
Final rept.,
A. Blumstein. Jan 83, 37p NIMH-84-454
Grant PHS-MH-28437

Improved models of incapacitation effects and improved estimates of the deterrent effects of sanctions on crime were developed. The concept of the stability of punishment rates of time and an overall model for analysis of imprisonment effects were explored. In addition, measures characterizing individual crime careers were developed.

513,001
PB85-135093/GAR PC A02/MF A01
Indiana Univ. Research Foundation, Bloomington.
Structure and Effects of Occupational Sex Segregation.
Final rept.,
D. Snyder. May 80, 11p NIMH-84-455
Grant PHS-MH-30136

Patterns of unequal distributions of men and women across occupations and changes therein, both in historical and comparative perspective, were investigated. Economic, demographic, work content and work organization factors in occupation-specific patterns of change and instability in gender composition were studied. Patterns of change in occupational sex segregation and cultural differences were also considered.

513,002
PB85-135176/GAR PC A03/MF A01
Consortium for International Development, Tucson, AZ.
Role of Rural Sociologists in an Interdisciplinary Action Oriented Project: An Egyptian Case Study.
Technical rept.,
J. J. Layton, and M. S. Sallam. Sep 82, 31p AID-PN-AAM-202
Contract AID/NE-C-1351
Also pub. as Egypt Water Use and Management Project, Cairo. rept. no. EWUP/TR-13. Prepared in cooperation with Colorado State Univ., Fort Collins. Engineering Research Center.

Rural sociologists involved in an action-oriented interdisciplinary project perform a variety of roles. This paper examines how rural sociologists working in an on-farm water management project in Egypt execute their tasks by fulfilling the roles of analyst, advisor, and innovator. Such roles are performed in two distinct contexts which exist at the same time, an interdisciplinary context and a cross-cultural context. The project sociologists also have to coordinate their efforts with agronomists, economists, and engineers who are solving specific problems and implementing specific projects.

513,003
PB85-135333/GAR PC A07/MF A01
Checchi and Co., Washington, DC.
Sociological Profile: The Moors.
Rural assessment and manpower survey.
Feb 80, 133p AID-PN-AAM-174
Contract AID/afr-C-1489
Prepared in cooperation with Berger (Louis) International, Inc., East Orange, NJ., and Action Programs International, Santa Monica, CA.

The Moorish population in Mauritania has historically played a significant role in the nation's economic and social development. This paper reports on a study undertaken to determine factors in past and present Moorish society which have created obstacles to development. The authors first present a historical overview of Moorish society from prehistoric times to the present. The second part of the paper provides information on production, consumption, and distribution patterns in the Moorish economy, and discusses Moorish social organization in terms of kinship, power, and social stratification. Economic and social dislocations (especially the growing power of sedentary farming groups) and the catastrophic climatic conditions of the last decade are held responsible for Mauritania's current state of underdevelopment.

513,004
PB85-136315/GAR PC A08/MF A01
National Research Council, Washington, DC. Committee on Population and Demography.
Estimation of Recent Trends in Fertility and Mortality in Egypt,
G. Askar, A. J. Coale, M. Desouki, M. El-Badry, and M. H. El Guindy. 1982, 163p R-9, AID-PN-AAL-715
Grant AID/DSPE-G-0061

This report provides a detailed review of mortality and fertility in Egypt from 1927 to 1979. After presenting background socioeconomic information, the authors outline changes in fertility and mortality since 1927 discuss sources of demographic data in Egypt, and describe their methods of estimating fertility and mortality trends. Appendices provide detailed mortality and fertility estimates, a reconstruction of 1927-77 population projections, and data on underregistration of vital events.

513,005
PB85-137396/GAR PC A03/MF A01
International Statistical Inst., Voorburg (Netherlands).
Comparative Studies. Cross National Summaries Number 19: Differentials in Age at First Marriage,
J. McCarthy. Jun 82, 49p AID-PN-AAL-753
Prepared in cooperation with Johns Hopkins Univ., Baltimore, MD. Dept. of Population Dynamics. Sponsored by World Fertility Survey, London (England), and United Nations Fund for Population Activities, New York.

Age at first marriage, an important determinant of the average period a woman is exposed to the risk of childbearing, has long been of major interest to demographers. This report describes differentials in age at first marriage within the categories of education and area of residence for 19 countries which participated in the World Fertility Survey (WFS). The report first notes several problems with comparing WFS data among the countries and briefly reviews national patterns of age at first marriage. Urban-rural and educational differences in age at first marriage are then assessed.

513,006
PB85-138402/GAR PC E05/MF E05
Sussex Univ., Brighton (England). Science Policy Research Unit.
Adaptation to Unemployment.
Occasional paper series,
I. Miles. c1983, 94p SPRU/OP/SER-20, ISBN-0-903622-21-1

Unemployment: Then and Now--The waves of unemployment experienced by the West in the twentieth century have each stimulated considerable amounts of research on the social, psychological and health implications of unemployment.

513,007
PB85-140259/GAR PC A07/MF A01
Agency for International Development, Washington, DC.
Impact Evaluation of Housing Guaranty Programs in Panama.
Project impact evaluation rept. no. 41,
A. W. McDonald, M. Sorock, C. Luzuriaga, V. Rivera, and R. Roeser. Mar 83, 137p AID-PN-AAL-008

In 1974-1975, in response to the 'New Directions' policy, the Government of Panama (GOP) and USAID/Panama began to reorient HG projects toward the poor majority and away from the middle- and lower middle-income segments of society. The Panama HG impact evaluation conducted in November-December 1981 focuses primarily on two projects within the program: HG 008 which provided $3.4 million for homes to be built by the Nuevo Chorrillo Housing Cooperative, and HG 009 which provided $15 million for slum upgrading in the San Miguelito squatter district. These projects were selected because they were the first completed activities intended to reach a significant number of low-income beneficiaries.

513,008
PB85-854297/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Women as Consumers and Providers of Health Care. 1970-January 1985 (Citations from the NTIS Data Base).
Rept. for 1970-Jan 85.
Jan 85, 170p
Supersedes PB83-805796.

This bibliography contains citations concerning the role of women as producers in the health labor force, and as consumers of health care services. Topics include health care requirements and staffing studies, family planning, and the availability and delivery of health services to women. The status of women as administrators and as medical students is also discussed. (This updated bibliography contains 167 citations, 11 of which are new entries to the previous edition.)

513,009
SHR-0011689/GAR PC A12/MF A01
Massachusetts Dept. of Elder Affairs, Boston.
Congregate Housing for Older People: An Effective Alternative. An Assessment of Its Cost Effectiveness.
Final rept.,
R. Mollica. Jan 84, 256p
See also SHR-0011690. Sponsored by Administration on Aging, Washington, DC. Prepared in cooperation with Building Diagnostics, Inc., Cambridge, MA.

A detailed analysis of the effectiveness of the state-funded congregate housing program as a noninstitutional shared-living arrangement is detailed. Also addressed are program issues dealing with the efficiency of congregate housing as a shelter and service delivery site. Thirteen footnotes, 42 references, chapter tables, and interview and coding forms are provided.

513,010
SHR-0011690/GAR PC A04/MF A01

Massachusetts Dept. of Elder Affairs, Boston.
Congregate Housing for Older People: An Effective Alternative. Directory of Congregate Living Options in Massachusetts.
Final rept.,
R. Mollica. Jan 84, 72p
See also SHR-0011691. Sponsored by Administration on Aging, Washington, DC. Prepared in cooperation with Building Diagnostics, Inc., Cambridge, MA.

A broad range of shelter and service alternatives within the state of Massachusetts is described. These alternatives are diverse in physical design, management, and service characteristics as well as in the characteristics of the residents. All offer residents a private bedroom, access to shared living spaces, and minimal supervision. The listings provide information about sponsorship, residents, design, service, management, location, phone, contact persons, fees, admission policy, meal services, staff, and other data. Categories include the house model, the small apartment model, the large apartment model, the apartment building with extra services, the grand hotel model, the continuum of care model, and arrangements designed to meet unique conditions. Indices provide alphabetical, location, and funding sources listings.

513,011
SHR-0011691/GAR PC **A09/MF A01**
Massachusetts Dept. of Elder Affairs, Boston.
Congregate Housing for Older People: An Effective Alternative. Final Report,
R. Mollica. Feb 84, 189p
See also SHR-0011689. Sponsored by Administration on Aging, Washington, DC. Prepared in cooperation with Building Diagnostics, Inc., Cambridge, MA.

The results of a study of the Massachusetts congregate housing program are presented. Interviews were conducted with residents, management personnel, service providers, and architects. The results are reported in the following categories: forms of congregate houses; the local community context; the boundary between development and operation; residents in transition; the congregate resident profile; congregate live and resident roles; the frailty image; critical design elements; living in the congregate; congregate housing management; the coordinator role; formal support services; cost effectiveness; and social effectiveness. A 42 - item bibliography, chapter tables, and appendixes are included.

513,012
SHR-0011697/GAR PC **A04/MF A01**
National Aging Policy Center on Income Maintenance, Waltham, MA.
Labor Force and Pension Factors Affecting the Income of Minority Older Persons: An Overview of Current Knowledge.
Working paper,
T. D. Leavitt, and S. Litkouhi. Apr 83, 52p WP-10
Grant AOA-90-AP-0005(03)

This paper surveys existing data on the labor force characteristics and experience of Blacks and Hispanics with the aim of identifying factors that lead to lower wages and hence lower retirement income among these minorities. The major data sets that have included information on labor force characteristics for various race and / or ethnic categories are listed. Findings from these surveys are discussed, including available evidence regarding the labor force participation, industry, occupation and occupational mobility, educational status, health status, and attitudes toward work of minority workers. Private pension coverage and benefit receipt within the minority workforce are examined and compared to the nonminority experience. The sources of income and the well - being of today's minority elderly during retirement are discussed. Minorities are found to be distributed differently than whites among various industries and occupations, and less likely to experience occupational upward mobility. Earnings are found to be significantly lower than those of whites. Minorities are also noted as having consistently lower educational attainment and health status. These factors are associated with private pension coverage, which is significantly lower than that of whites, although there is progress in this area. It is suggested that minorities have a much lower rate of benefit receipt, due in part to their more disrupted work histories and the resulting low levels of tenure.

513,013
SHR-0011698/GAR PC **A05/MF A01**
National Policy Center on Housing and Living Arrangements for Older Americans, Ann Arbor, MI.
Use of Productive Resources: Pension Funds, Building Industry, Existing Housing,
J. Edelstein, and R. Timmons. 1982, 86p
Sponsored in part by Administration on Aging, Washington, DC.

Financial resources and housing production are discussed in two sections. The potential for involvement of pension fund assets in the housing market is considerable. The disparity between potential and performance of the funds invested is the result of two factors: the guidelines set by the Employee Retirement Income Security Act of 1974 (ERISA), and the state of the housing market or the fund managers' knowledge of the market. Of the plans not covered by ERISA, government plans have been the most active and innovative in using their assets to invest in the housing market. The section on the utilization of housing resources focuses on housing production. It reviews ways in which the elderly can compete for the small quantity of new housing produced. One way of reducing the cost of housing is to increase the supply of low - cost housing. There are two main ways to do this: through new construction, and through adaptive reuse, a strategy for utilizing surplus housing resources for housing production. Manufactured housing, such as mobile homes, has proven to be a source of low cost quality housing with some particular benefits for the elderly. One of the reasons why the two recommended strategies are not more commonly in use is due to regulatory and institutional barriers. The first section provides 51 references; the second 49. A total of 18 items are found in the bibliography.

513,014
SHR-0011713/GAR PC **A03/MF A01**
National Aging Policy Center on Income Maintenance, Waltham, MA.
Determination of Disability: Medical and Nonmedical Factors.
Working paper,
A. Knijinsky. Jun 83, 42p WP-9
Grant AOA-90-AP-0005(02)

The feasibility of establishing a set of independent variables for the prediction of disability status is analyzed. Discrimination analysis was used for the analysis. The procedure was employed on the entire research population of 4,175 and on a subsample of 1,592. The research population consisted of men who claimed they possessed health problems and who did something other than attend school. The study examined the utility of 24 variables, representing medical and nonmedical factors, as predictors of disability. The best classification results came from the function predicting the disability status of the entire research sample according to the work and earnings limitations definition. Changes in the balance of the errors in classification reduced only slightly the effectiveness of the function as a predictive device. The least effective use of functional limitations, age, education, and occupational skills was as predictors of Social Security Disability Income disability determinations. A weighting procedure which compensated for the disproportional sampling of the Social Security Administration frame in the survey did not improve the ability of the chosen variables to predict the SSDI status of that frame. Five tables and 27 references are included.

513,015
SHR-0011732/GAR PC **A03/MF A01**
Wisconsin Dept. of Health and Social Services, Madison.
Technical Assistance, Training, and Consultation. Experiences and Recommendations for Community-Based Long-Term Support Services,
M. M. Brost, J. B. Zitske, and J. N. Lorimer. Jan 84, 45p
Grant AOA-90-AJ-1004(01)

The technical assistance portion of the Wisconsin Community Options Program is reviewed. The program required the development of agency linkages, procedural cooperation and creative problem solving that did not exist in the state's community based long term support system. The specific objectives of the technical assistance portion of the project were to provide direct technical assistance and consultation to counties implementing the program and to develop a summary of the amount and type of technical assistance needed to expand the program from the original 8 counties to all 72. Several general trends emerged: technical assistance needs to be of several different types, technical assistance needs to continue to be available through a variety of means, and the type of consultation needed would go further into the area of long term support than just the Community Options Program. The experience in the technical assistance project also identified areas where the needed technical assistance was not available and should be developed for the future. These areas include methods for coordination with the medical community, techniques for dealing with inter - agency disputes that impeded the success of the programs, lack of a sufficient number of consultants, lack of sufficient materials, lack of funding, need to coordinate efforts to utilize the expertise of others, and need to provide training and consultation to the staff in the responsible county agencies.

513,016
SHR-0011734/GAR PC **A03/MF A01**
Area XIV Agency on Aging, Creston, IA.
Congregate Housing Demonstration Project for the Elderly.
Final rept.,
L. E. Houston. Jan 84, 29p
Grant AOA-90-AM-2131
Sponsored in part by Administration on Aging, Washington, DC.

An Iowa demonstration project on helping the rural elderly is described. There is a lack of adequate housing and special living arrangements for older persons in rural areas which often causes premature or unnecessary institutionalization. The objectives of this demonstration project were: to bring older persons together so that physical and social services could be effectively and economically provided; to bring older persons together so that they could serve one another's needs for companionship and supervision; and, to bring older persons together so that they could be integrated more effectively into the life of the larger community. The project was designed to maximize resources through the cooperative endeavors of the area agency, the developer, the architect, the city, and the various service delivery groups, in the community. Congregate housing met the need for affordable, appropriate housing and services for older persons in the rural area. As a result, the community benefitted, the older persons benefitted, and the taxpayers benefitted. The demonstration created an alternative living arrangement between totally independent living and totally dependent care.

513,017
SHR-0011761/GAR PC **A03/MF A01**
New York City Dept. for the Aging.
Focal Points: A Feasibility Study.
Final rept.,
R. H. Sherman, M. J. Mayer, M. Silverstein, M. A. Zimmermann-McKinney, and J. Harter. Sep 83, 43p
Grant AOA-90-AR-0039

The practicalities of community - based efforts to coordinate services are examined. Four communities are studied. The study was concerned only with the formally structured aspects of service coordination. Study findings support the feasibility of focal point development in an urban environment when the program design is modified to meet the needs and conditions imposed by the nature of the environment. Study findings also highlight the fact that in urban areas community coordinating groups play a significant role in bringing service agencies and organizations together to work on behalf of older people, a role that appears to be a 'sine qua non' to focal point development when a previously identified model is not imposed. Findings and implications are listed.

513,018
SHR-0011772/GAR PC **A04/MF A01**
Clark Coll., Atlanta, GA.
Building Self-Help: The Needs of the Elderly on the Southside of Atlanta.
1983, 68p
Sponsored in part by Administration on Aging, Washington, DC. Report of three Workshops held in Atlanta, Georgia, April 7-9, July 20, and August 2-3, 1983.

Proceedings are presented of three workshops held to assess the needs of the elderly of southside Atlanta. The first, held April 7-9 1983, addressed such topics as housing and public safety; transportation and special services; support groups and self-help for the black elderly; nutrition and adult care; and the role of churches in providing self-help for the elderly. The second workshop, held on July 20, 1983, focused on the elderly's need for support groups. The third workshop, which

took place on August 2 and 3, 1983, addressed ways to plan and fund self-help support activities, with a focus on proposal research and writing, census data sources for the elderly population, and ways to define budget needs. Appendices contain a partial listing of support groups in the metropolitan Atlanta area, a bibliography on support groups, and lists of program speakers, panelists, participants, and members of the advisory committee to the Clark College Gerontology Program.

513,019
SHR-0011911/GAR PC A06/MF A01
National Inst. on Drug Abuse, Rockville, MD.
Parents, Peers and Pot,
M. Manatt. 1980, 108p DHHS/PUB/ADM-80-812

A strategy for parents who wish to prevent marijuana use among their children is described. The strategy is designed for children ages 9 to 14. The nature of the drug culture and its evolution are explored. The physical and psychological effects of marijuana use are explained, along with the sequential pattern of drug use. Parents are advised to become knowledgeable about drugs and the current drug scene. It is suggested that they be alert for signs of drug use and that they make it clear to their children that drug use will not be tolerated. It is recommended that they emphasize the ban on drug use in the context of the child's changes during adolescence. Consistent and enforced behavior and rules are emphasized to reinforce the ban on drug use. The importance of other adults, whether they be the parents of friends or teachers or others, in reinforcing the importance of abstaining from drugs is noted. The development of alternative activities and opportunities for adolescents is suggested. Advice is offered to single and working parents, as well as to adults who themselves use legal and/or illegal drugs.

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

513,020
AD-A148 613/3/GAR PC A02/MF A01
Hahnemann Medical Coll. and Hospital, Philadelphia, PA.
Genetic and Physical Structure of Salmonella-coli Phage Hybrids and Development of New Generalized Transducing Hybrid Phages for E. Coli.
Annual progress rept. 1 Feb-31 Aug 83,
N. Yamamoto. May 84, 12p
Contract DAMD17-79-C-9134

We have isolated unusual hybrid bacteriophages by recombining the evolutionary diverse bacteriophages Salmonella phage P22 and coliphages Mu80 or a mutator phage Mu. Genetic analysis of Mu80imP22 hybrid genomes led us to isolate high specialized transducing phages for argF and proAB genes of the E. coli chromosome although the parental phage Mu80, is a specialized transducing phage for the E. coli trp operon. Phage P22 can recombine with coli-mutator phage Mu. Genetic studies correlated with serological and host range analyses of MuimmP22 hybrids revealed that crossovers occurred at the tail fiber genes within the invertible G segment of Mu phage and the tail spike gene of P22 phage to form MuimmP22 hybrids. MuimmP22 hybrids infect hosts carrying the smooth host O-antigen (Man-Rha-Gal)n repeating unit which is specific receptor for adsorption of P22 phage. However, anti-P22 serum is unable to neutralize the MuimmP22 hybrids. This is probably because the contribution of P22 spike peptide to the hybrid tail fiber is to short to form P22 spike like structure and antigenicity. Anti-serum prepared for the G(+) orientation of Mu phage neutralized the MuimmPss hybrid at about a 1/10 neutralization rate of MuG(+) phage. Thus we suggested that MuimmP22 hybrid may carry the inverted (-) orientation of the G segment of Mu phage.

513,021
AD-A148 691/9/GAR PC A03/MF A01
Hahnemann Univ. School of Medicine, Philadelphia.
Genetic and Physical Structure of Salmonella-coli Phage Hybrids and Development of New Generalized Transducing Hybrid Phages for E. Coli.
Final rept. 1 Jan 74-31 Aug 83,
N. Yamamoto. May 84, 31p
Contracts DAMD17-74-C-4051, DAMD17-79-C-9134

Hybrids between unrelated bacteriophages are invaluable models to study genetic evolution, gene regulation, and morphogenesis. For many years studies in my laboratory have been focused on the mechanism of hybrid formation between evolutionary diverse phages. Collaborative studies with a group of Walter Reed Army Institute of Research began searching for E. coli-S. typhimurium recombinants in 1971. After isolating E. coli-S. typhimurium hybrids which are common hosts for the various coli and Salmonella phages, we developed efficient selective methods of hybrids between Salmonella and E. coli phages and have isolated numerous hybrid phages in a tailor made fashion by varying the selection procedure.

513,022
AD-A148 835/2/GAR PC A03/MF A01
Tennessee Univ. Memorial Research Center, Knoxville. Dept. of Medical Biology.
Effect of Perfluorodecanoic Acid on the Efflux of 2-Aminopurine from L5178Y Cells.
Annual research rept. 1 Aug 83-31 Jul 84,
P. W. Wigler. 15 Sep 84, 29p AFOSR-TR-84-1119
Grant AFOSR-82-0261

Transporters in the cell membrane of animal cells are susceptible to the action of toxic environmental agents. L5178Y mouse leukemia cells were treated with 150 micrograms/ml perfluorodecanoic acid (PFDA), a toxicant, in growth medium for 24 hr at 30 C. The PFDA-treated cells were transferred to fresh growth medium to demonstrate recovery of the capacity to transport a fluorescent purine, 2-aminopurine (AP). The membrane flux of AP was estimated with a high-speed kinetic assay. The cells were preloaded with 100 micrometers AP and rinsed twice in a cold buffer. The preloaded cells were resuspended in buffer at 21 C and AP flux was estimated continuously from the fluorescence emission of AP at 370 nm. At the beginning of the recovery period, AP efflux from PFDA-treated cells was markedly inhibited in comparison with the untreated controls. After 2 days at 37 C, the count of PFDA-treated cells doubled and the initial rate of AP efflux returned to approximately 60% of the controls. After 6 days at 30 C, the cell count increased 2.7-fold and AP efflux returned to approximately 60% of the controls. The results of experiments with untreated control cells show that the initial rate of AP efflux is proportional to the intracellular AP concentration.

513,023
DE84012556/GAR PC A02/MF A01
Mount Sinai School of Medicine, New York.
Respiratory Chain of Alkalophilic Bacteria. Annual Progress Report, July 1, 1983-April 30, 1984.
T. A. Krulwich. 1984, 5p DOE/ER/10871-T1
Contract AC02-81ER10871

Studies of the respiratory chain of alkalophilic bacteria have indicated that these organisms possess specific adaptations so that the unusual energy demands of life at high pH can be met. During the past year, structural studies of respiratory chain components were initiated. The cytochrome oxidase from Bacillus firmus RAB was purified and characterized. Proton pumping studies by reconstituted preparations have been started. The interesting problem of the regulation of cytochrome levels in the alkalophiles has been examined via pH shift experiments and via a new hypothetical framework which may generate a successful experimental approach to the mechanism whereby non-alkalophilic mutants have greatly reduced cytochrome levels. 9 references. (ERA citation 10:003425)

513,024
DE85000423/GAR PC A02/MF A01
New York Univ., NY.
Physico-Chemical Methods for the Study of Polycyclic Aromatic Hydrocarbon Carcinogen-DNA Interactions. Progress Report, October 1, 1981-September 30, 1984.
N. E. Geacintov. 15 Oct 84, 10p DOE/EV/04959-6
Contract AC02-78EV04959

Research completed over the past three years is summarized. Topics discussed include: triplet probe methods for studying the micro-confirmations of aromatic molecules bound to DNA; electric linear dichroism studies of conformations of adducts derived from the binding of structurally related PAH epoxide model compounds to DNA; mechanisms of reaction of PAH diol epoxides in aqueous solutions containing DNA; stereoselective binding of enantiomers of BaPDE with DNA; development of a new flow dichroism technique to monitor changes in the orientations of carcinogens at DNA binding sites as they undergo reactions with nucleic acids; and the binding of anti-BaPDE to a typical carrier protein (serum albumin). 3 figures. (ERA citation 10:001305)

513,025
DE85000623/GAR PC A10/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Isolation and Characterization of Photosynthetic Reaction Centers from Rhodopseudomonas Capsulata and Rhodopseudomonas Sphaeroides.
S. T. Worland. Sep 84, 207p LBL-18375
Contract AC03-76SF00098
Thesis.
Portions are illegible in microfiche products.

Reaction centers were isolated by affinity chromatography on equine cytochrome C. Peripheral proteins were removed with 0.05% LDAO. Absorption and EPR spectra and bleaching assays indicate that the reaction centers retained their electron donors and acceptors in the native environment. Three reaction center polypeptides were isolated and submitted for amino-terminal sequence determination. By comparing these sequences to those deduced from DNA, it was established that the M and L subunits are post-translationally modified to remove the aminoterminal Met, whereas the H subunit is not. Inhibition of O sub 2 evolution in photosystem II particles from spinach by naphthoquinone derivatives show O sub 2 inhibition by bromomethyl and acetoxymethyl derivatives but not with hydroxymethyl derivatives. Inhibition by acetoxymethyl derivatives in irreversible and dependent on illumination suggesting that reduction of the quinone is necessary. Therefore acetoxymethyl derivatives may be useful as suicide reagents for labelling quinone binding sites. Procedures were developed to extract one or both of the quinones present in reaction centers and preserve the integrity of the co-factor binding sites. The H and M subunits were cleaned using furmic acid. Both fragments were isolated from the H subunit, while the larger fragment was isolated from the M subunit. Electrophoretic mobilities of the isolated fragments agrees well with the expected molecular weights. The L subunit was digested with Staphylococcus areus vs protease. The pattern obtained was consistant with the potential sites of cleavage, but it was not possible to assign cleavage sites unambiguously. 112 references, 37 figures, 2 tables. (ERA citation 10:001217)

513,026
DE85001195/GAR PC A08/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Phosphorus-31 NMR Magnetization Transfer Measurements of Metabolic Reaction Rates in the Rat Heart and Kidney in Vivo.
A. P. Koretsky. Aug 84, 166p LBL-18376
Contract AC03-76SF00098
Thesis.
Portions are illegible in microfiche products.

This dissertation is concerned with the measurement of the rates of ATP synthesis in the rat kidney and of the creatine kinase catalyzed reaction in the rat heart in situ. Chronically implanted detection coils, employing a balanced matching configuration of capacitors in the tuned circuit, were used to obtain exp 31 P NMR spectra from heart, kidney, and liver in situ. Gated spectra of heart obtained at systole and diastole and the effects of fructose on kidney and liver were studied. The ability to observe other nuclei using implanted coils is illustrated with exp 39 K NMR spectra from kidney and muscle. The theoretical considerations of applying magnetization transfer techniques to intact organs are discussed with emphasis on the problems associated with multiple exchange reactions and com-

partmentation of reactants. Experimental measurements of the ATP synthesis rate (13 mu mol/min/gm tissue) were compared to whole kidney oxygen consumption and Na exp + reabsorption rates to derive ATP/O (0.8 to 1.7) and Na exp + /ATP (4 to 10) values. The problems associated with ATP synthesis rate measurements in kidney, e.g., the heterogeneity of the inorganic phosphate resonance, are discussed and experiments to overcome these problems proposed. (ERA citation 10:003428)

513,027
PATENT-4 473 494 Not available NTIS
Department of the Army, Washington, DC.
Preparation of Stroma-Free, Non-Heme Protein-Free Hemoglobin.
Patent,
R. W. Tye. Filed 4 May 83, 4p AD-D011 435/5, PAT-APPL-6-497 455
Supersedes PAT-APPL-6-497 455.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $1.00.

A method for the production of stroma-free, non-heme protein-free hemoglobin by use of zinc ion to promote precipitation of a zinc ion-bound insoluble hemoglobin complex, followed by membrane ultrafiltration of the zinc-hemoglobin complex from the filtrate fluid medium, preferably with a saline dialyzate.

513,028
PB85-145555 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Physicochemical Bench-Scale Caries Model.
Final rept.,
L. C. Chow, and W. E. Brown. Jun 84, 6p
Sponsored by American Dental Association Health Foundation, Chicago, IL.
Pub. in Jnl. of Dental Research 63, n6 p868-873 Jun 84.

A diffusion cell comprising two compartments separated by a commercial membrane of known ion permselectivity was used as an experimental model to study factors which may affect caries formation. One compartment (the 'lesion') contained an excess of hydroxyapatite or fluorapatite crystals, and its solution was kept near saturation by stirring. An unsaturated acidic calcium phosphate solution flowed continuously through the other compartment (the 'Plague-saliva'), thus providing the driving force for dissolution of the crystals as modified by the permeability of the membrane and/or the presence of fluoride. Calcium, phosphate, fluoride, and chloride concentrations, pH, and membrane potential were measured at steady state.

6B. Bioengineering

513,029
PB85-139897/GAR PC **A05/MF A01**
Lister Hill National Center for Biomedical Communications, Bethesda, MD.
Designing Microcomputer Patient Management Simulations,
C. Locatis, and M. Lunin. Sep 84, 98p LHNCBC-84-1

The document is a beginner's guide to designing patient management simulations for presentation on microcomputers. Background information on simulation and microcomputers is discussed; principles of design are described. The principles concern development of branching simulations that can be accommodated in computer environments. Authoring techniques and rules for creating displays and other features of computer-based instruction are delineated. Coding protocols in BASIC are included in an appendix.

6C. Biology

513,030
AD-A148 603/4/GAR PC **A02/MF A01**
Yale Univ., New Haven, CT.
Genetic Characterization of Insect Vectors of Disease.
Annual rept. 1 Feb-31 Aug 81,
J. R. Powell. 1 Sep 81, 10p
Contract DAMD17-81-C-1026

We have carried out extensive population genetic studies on the yellow fever mosquito, Aedes aegypti, concentrating on populations from the southern U.S. The goal of the research is to define genetic-geographic groupings of this serious vector.

513,031
AD-A148 604/2/GAR PC **A03/MF A01**
Yale Univ., New Haven, CT.
Genetic Characterization of Insect Vectors of Disease.
Annual rept. 1 Sep 81-31 Aug 82,
J. R. Powell. 1 Sep 82, 33p
Contract DAMD17-81-C-1026

The proposed projects involved population genetic analysis of Aedes aegypti. The main technique employed is gel electrophoresis of soluble proteins followed by staining for specific enzyme activity. Using this method we have identified 22 enzyme loci in this mosquito, of which 11 are particularly variable (polymorphic) and useful for our studies. The objectives of the research are to study allelic variation at these loci in order to answer the following questions about A. aegypti: (1) How genetically variable are populations. (2) How much genetic differentiation exists between populations. (3) Can we define areas within the distribution of A. aegypti which have populations genetically similar and differentiated from other areas. (4) Do the world-wide patterns of genetic variation in this vector correspond in any way to patterns of diseases transmitted by A. aegypti.

513,032
AD-A148 827/9/GAR PC **A02/MF A01**
Naval Medical Research Unit No. 3, FPO New York 09527.
Beta-Ecdysone Effects on the Camel Tick, Hyalomma dromedarii (Acari:Ixodidae).
Publication rept.,
G. M. Khalil, A. A. A. Shaarawy, D. E. Sonenshine, and S. M. Gad. 30 Mar 84, 9p Rept nos. NAMRU-3-PR-23/84, NAMRU-3-ACC-1374
Pub. in Jnl. of Medical Entomology, v21 n2 p188-193, 30 Mar 84.

No abstract available.

513,033
DE85000229/GAR PC **A02/MF A01**
Brookhaven National Lab., Upton, NY.
Potential Contributions of Molecular Genetics to Plant Breeding.
B. Burr. 1984, 12p BNL-35224, CONF-8408120-1
Contract AC02-76CH00016
Plant breeding research forum, Sayzata, MN, USA, 21 Aug 1984.

In the near future (10 to 15 years), the contributions to plant breeding technology from molecular genetics, while useful, will be more modest than spectacular claims have led many to expect. These contributions will come in two areas: the development of analytical technique and in the detailed analysis and explanation of biological phenomena related to plant breeding. The author provides an example of each from his work. 24 references. (ERA citation 10:003414)

513,034
PB85-134450/GAR PC **A02/MF A01**
American Embassy, Santiago (Chile).
Chile: Industrial Outlook Report, Fishing Industry, 1983.
Final rept.,
C. F. Singer. 18 Oct 84, 21p NMFS-FM321/84-23

Chile reported a record catch surpassing 4.0 million metric tons in 1983, an increase of 8.4 percent over 1982. The 1982-83 'El Nino' phenomenon increased the quantity of the landings, apparently causing a shift southward into northern Chilean waters of fish normally found further north off Peru. The El Nino also affected the species composition of the catch. The two major fish species caught, however, remained the South Pacific sardine (2.8 million t) and the jack mackerel (0.8 million tons.) Fishmeal production and exports constituted the single most important activity of the industry. Clams made up the greatest percentage of molluscs, and crabs were the leading crustaceans. The value of exports reached $445 million, 8 percent above the 1982 level, accounting for nearly 12 percent of total Chilean export earnings.

513,035
PB85-134625/GAR PC **A02/MF A01**
American Embassy, Algiers (Algeria).
Algerian Fisheries, 1983.
Final rept.,
M. Lardjane. 5 Dec 84, 13p NMFS-FM321/84-24

The Algerian government is actively promoting its fishing industry, after recent attempts to develop it have been only partially successful. The present fisheries infrastructure is inadequate; maintenance facilities are scarce; and there is a shortage of qualified manpower. Current projects include construction of ten new fishing ports, installation of processing and cold storage facilities and extension of the fleet. The private sector, which accounts for 90 percent of catches, is receiving particular attention. In the 1980-84 Five Year Plan, it was allocated 30 percent of fisheries investment, or $117 million.

513,036
PB85-137529/GAR PC **A03/MF A01**
Maine Cooperative Fishery Research Unit, Orono.
Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (North Atlantic) - Atlantic Salmon,
D. S. Dante, J. G. Trial, and J. G. Stanley. Jul 84, 30p FWS/OBS-82/11.22
Sponsored in part by Army Engineer Waterways Experiment Station, Vicksburg, MS. Environmental Lab.

Species profiles are literature summaries on the taxonomy, morphology, range, life history and environmental requirements of coastal aquatic species. They are intended to assist in environmental impact assessment. Atlantic salmon are a highly prized sport fish and their flesh is gourmet table fare. Once abundant in New England's coastal rivers, they are only now being restored to portions of their original habitat. Populations declined following development of industries along rivers and commercial fisheries in estuaries. Atlantic salmon are anadromous. Spawning, embryo development and growth of young fish occur in freshwater streams and rivers. Juvenile survival is highest in clear, cool, well oxygenated streams. Following smoltification, a physiological change enabling entry into salt water, fish migrate downstream and then to oceanic feeding grounds near Greenland, where they grow rapidly.

513,037
PB85-137537/GAR PC **A03/MF A01**
Georgia Cooperative Fishery Research Unit, Athens.
Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (South Atlantic) - American Eel,
M. J. Van Den Avyle. Jul 84, 30p FWS/OBS-82/11.24
Sponsored in part by Army Engineer Waterways Experiment Station, Vicksburg, MS. Environmental Lab.

Species profiles are literature summaries of taxonomy, life history, and environmental requirements of coastal fishes and aquatic invertebrates. They are prepared to assist with impact assessment. The American eel, Anguilla rostrata, is an ecologically and economically important catadromous species that occupies freshwater streams, rivers, brackish estuaries, and the open ocean during various phases of its life cycle. Developing eels commonly remain in freshwater or brackish areas for 10-12 years before migrating to spawn. American eels tend to be bottom-dwellers and feed on a variety of fauna that occupy the same habitats. Eels occupy areas having wide ranges of temperature, salinity, and other environmental factors. Alteration of patterns of freshwater inflows to estuaries and bays could affect upstream migrations.

513,038
PB85-138055/GAR PC **A13/MF A01**
National Marine Fisheries Service, Seattle, WA. Northwest and Alaska Fisheries Center.
Proceedings of the Workshop on Walleye Pollock and Its Ecosystem in the Eastern Bering Sea Held at Seattle, Washington on 2-4 May 1983,
D. H. Ito. Aug 84, 296p NOAA-TM-NMFS-F/NWC-62

Contents:
Juvenile and adult Walleye Pollock of the Eastern Bering Sea:

Literature review and results of ecosystem workshop;
Eggs and larvae of Walleye Pollock and relationships to the planktonic environment;
Relationships between Walleye Pollock, other fish, and squid in the Eastern Bering Sea;
Apex predators in the Walleye Pollock ecosystem in the Eastern Bering Sea and Aleutian Islands regions;
Fisheries and economics.

6E. Clinical Medicine

513,039
AD-A148 592/9/GAR PC A02/MF A01
Institute for Medical Research, San Jose, CA.
Immunomodulation with Synthetic Molecules: Mechanisms of Actions and Effects on Macrophages.
Annual rept. no. 3, 1 Nov 83-31 Oct 84,
D. A. Stevens, E. Brummer, and C. J. Morrison. 1 Nov 84, 9p
Contract N00014-83-K-0018

Immunoenhancing drugs are under study both for their general effects on host immunity and their effects on immune interactions with microbial infections. These studies focused preferentially on defined synthetic single molecules, especially synthesized natural biological molecules or their active fragments. We studied the mechanism of muramyl dipeptide in inducing hyporesponsiveness of spleen cells and hyperresponsiveness of lymph node cells to mitogens defining the cell populations and mediators involved in these effects. In another study, murine macrophages from different anatomic compartments were compared for their fungicidal activity in different in vitro systems. Subsequently, the effect of a lipoidal amine immunomodulator on alveolar macrophage fungicidal activity was examined. The mechanism of immunological activation of polymorphonuclear neutrophils for fungicidal activity was studied with respect to the oxidative mechanisms involved.

513,040
AD-A148 605/9/GAR PC A03/MF A01
Peter Bent Brigham Hospital, Boston, MA.
Safety of Immunogenicity Testing of a Pilot Polysaccharide Vaccine Preparation to Pseudomonas aeruginosa.
Annual rept. 16 Aug 79-15 Aug 80,
G. B. Pier. Sep 80, 30p
Contract DAMD17-79-C-9050

The scope of this contract included preparation and testing of a pilot vaccine to Pseudomonas aeruginosa infections up to the human trial stage, development of assays for measuring the antibody response of immunized and infected individuals, testing of the immunogenicity of the vaccine product in animals, assessment of the material in compromised animal host models as a protective agent, assessment of cell mediated protective mechanisms induced by the vaccine, including in vitro cellular studies, determinations of the genetic basis of response to the vaccine in inbred mouse strains, and assessment of the role of lipopolysaccharide (LPS) as an immunogenic or biologically active component of the vaccine. The vaccine is a high molecular weight polysaccharide (PS) material isolated from the outer cell surface or cultural supernates of P. aeruginosa (1). Similar types of polysaccharides have been shown to be effective vaccines for a number of bacterial infections, such as meningitis caus by Neisseria meningitidis and pneumonia caused by Streptococcus pneumoniae.

513,041
AD-A148 606/7/GAR PC A02/MF A01
Peter Bent Brigham Hospital, Boston, MA.
Safety and Immunogenicity Testing of a Pilot Polysaccharide Vaccine Preparation to Pseudomonas aeruginosa.
Annual rept. 16 Aug 80-1 Aug 81,
G. B. Pier. 1 Sep 81, 16p
Contract DAMD17-79-C-9050

The scope of this contract included preparation and testing of a pilot vaccine to Pseudomonas aeruginosa infections including human phase 1 trials, development of assays for measuring the antibody response of immunized and infected individuals, testing of the immunogenicity of the vaccine product in animals, assessment of the material in compromised animal host models as a protective agent, assessment of cell mediated protective mechanisms induced by the vaccine, including in vitro cellular studies, determinations of the genetic basis of response to the vaccine in inbred mouse strains, and assessment of the role of lipopolysaccharide (LPS) as an immunogenic or biologically active component of the vaccine. The vaccine is a high molecular weight polysaccharide (PS) material isolated from the outer cell surface or cultural supernates of P. aeruginosa (1). Similar types of polysaccharides have been shown to be effective vaccines for a number of bacterial infections, such as meningitis caus by Neisseria meningitidis and pneumonia caused by Streptococcus pneumoniae.

513,042
AD-A148 607/5/GAR PC A04/MF A01
Peter Bent Brigham Hospital, Boston, MA.
Safety and Immunogenicity Testing of a Pilot Polysaccharide Vaccine Preparation to Pseudomonas aeruginosa.
Annual rept. 2 Aug 81-15 Aug 82,
G. B. Pier. 1 Sep 82, 66p
Contract DAMD17-79-C-9050

The scope of this contract included preparation and testing of a pilot vaccine to Pseudomonas aeruginosa infections including human phase 1 trials, development of assays for measuring the antibody response of immunized and infected individuals, testing of the immunogenicity of the vaccine product in animals, assessment of the material in compromised animal host models as a protective agent, assessment of cell mediated protective mechanisms induced by the vaccine, including in vitro cellular studies, determinations of the genetic basis of response to the vaccine in inbred mouse strains, and assessment of the role of lipopolysaccharide (LPS) as an immuogenic or biologically active component of the vaccine. The vaccine is a high molecular polysaccharide (PS) material isolated from the outer cell surface or cultural supernates of P. aeruginosa (1). Similar types of polysaccharides have been shown to be effective vaccines for a number of bacterial infections, such as meningitis caused by Neisseria meningitidis and pneumonia caused by Streptococcus pneumoniae.

513,043
AD-A148 609/1/GAR PC A02/MF A01
Maryland Univ., Baltimore.
Neohemoglobins and Cross-Linked Hemoglobins as Blood Substitute.
Annual summary rept. no. 1, 1 Sep 81-15 Nov 82,
E. Bucci. Dec 82, 17p
Contract DAMD17-81-C-1191

We have investigated the effect of heme modifications and specific cross-linking of beta subunits in human and bovine hemoglobins. It appears that both techniques can be utilized for obtaining products potentially useful as oxygen carriers in resuscitative fluids.

513,044
AD-A148 647/1/GAR PC A02/MF A01
Yale Univ., New Haven, CT. School of Medicine.
Rapid Diagnosis of Arbovirus and Arenavirus Infections by Immunofluorescence.
Annual progress rept. 1 Sep 81-31 Jan 82,
G. H. Tignor. 1 Feb 82, 15p
Contract DAMD17-81-C-1156

A serologic survey of equatorial Africa for antibodies in man to Crimeanhemorrhagic fever-Congo, Rift valley fever, Ebola, Lassa fever, and Marburg viruses was begun. Positive reactions to Ebola virus have been observed with sera from military recruits from southern Sudan (41.3%) but rarely with sera from military recruits from northern Sudan (1.5%). Ebola positive reactions have also been found in sera from life-long residents of Senegal's lower Fleuve region in the Senegal River Valley. Antibody to Rift Valley Fever and Lassa viruses was also found in Senegal. Human sera from Ethiopia and Senegal have been screened on polyvalent spot-slides. The rate of positive reaction varies with geographic region. One hundred and fifty-eight (158) bunyavirus supergroup viruses have been screened for reaction on KHF virus-infected spot-slides. Positive reactions have been found with several group Tete viruses and with one antibody preparation to Manawa virus.

513,045
AD-A148 745/3/GAR PC A02/MF A01
Walter Reed Army Inst. of Research, Washington, DC.
Oral Vaccination of Monkeys with an Invasive Escherichia coli K-12 Hybrid Expressing Shigella flexneri 2a Somatic Antigen.
S. B. Formal, T. L. Hale, C. Kapfer, J. P. Cogan, and P. J. Snoy. Nov 84, 7p
Pub. in Infection and Immunity, v48 n2 p465-469 Nov 84.

No abstract available.

513,046
AD-A148 767/7/GAR PC A02/MF A01
Walter Reed Army Inst. of Research, Washington, DC.
Differential Cytotoxic Effects of Toxin A and B Isolated from Clostridium difficile.
S. W. Rothman, J. E. Brown, A. Diecidue, and D. A. Foret. Nov 84, 10p
Pub. in Infection and Immunity, v46 n2 p324-331 Nov 84.

No abstract available.

513,047
AD-A148 806/3 Not available NTIS
Naval Biosciences Lab., Oakland, CA.
Use of the Directigen Latex Agglutination Test for Detection of Haemphilus influenzae, Streptococcus pneumoniae, and Neisseria meningitidis Antigens in Cerebrospinal Fluid from Meningitis Patients.
J. E.Sippel, P. A. Hider, G. Controni, K. D. Eisenach, and H. R. Hill. Nov 84, 3p
Availability: Pub. in Jnl. of Clinical Microbiology, v20 n5 p884-886 Nov 84 (No copies furnished by DTIC/NTIS).

No abstract available.

513,048
AD-A148 812/1/GAR PC A02/MF A01
Albert Einstein Coll. of Medicine, Bronx, NY.
Characterization of Antibody-Dependent Killing of Trypanosomes by Macrophages.
Annual summary rept. 15 Jan 82-14 Jan 83,
D. L. Rosenstreich, and H. C. Greenblatt. Apr 83, 21p
Contract DAMD17-81-C-1196

In the presence of antibody, macrophages bind trypanosomes in vitro. The cellular and humoral components of this assay have been studied and defined. In general, such antibody must be specific for the trypanosome variant. However, WRATat-14 and WRATat-15 variants, obtained after vector transmission of WRATat-1.1, mediated of WRATat-1 trypanosomes to macrophages. Using a large panel of anti-WRATat-1.1 specific monoclonal antibodies, a close correlation was found between the ability to mediate macrophage binding in vitro, and in vivo trypanosome neutralization. The relative efficacy of various immunoglobulin subclasses was analyzed. Monoclonal antibodies of all subclasses were able to mediate trypanosome binding by macrophages. However, when polyvalent anti-WRATat-300 (Wellcome) serum from a rabbit infected 4 weeks was fractionated into isotype specific-immunoglobulins, only the cold-precipitable portion of IgM was functional. The role of complement was also analyzed. It was confirmed that complement enhances macrophages binding of trypanosomes in the presence of limiting dilutions of antiserum. There was no species specificity in the action of complement since dog, human, guinea pig and mouse sera could be used as complement sources.

513,049
AD-A148 837/8/GAR PC A03/MF A01
Ohio State Univ. Research Foundation, Columbus.
Immune Dysfunctions and Abrogation of the Inflammatory Response by Environmental Chemicals.
Annual rept. 1 Jul 83-30 Jun 84,
R. G. Olsen. 31 Aug 84, 27p AFOSR-TR-84-1123
Contract F49620-83-C-0114

Experiments done during FY 1983-1984 provide further evidence 1-1 that (UDMH) dimethylhydrazine enhances the immune system. The allogeneic mixed lymphocyte reaction (MLR) was enhanced by UDMH both when splenocytes in the reaction were incubated in the presence of UDMH, and when splenocytes from mice treated with UDMH were assayed in the MLR. The enhancement was most notable both in vivo and in vitro when the macrophage and B-cell enriched

(simulator) population was exposed to UDMH. This supports our hypothesis that macrophage suppressor activity is abrogated by UDMH, possibly by reduction of prostaglandin synthesis by the macrophage. Other experiments indicate that this effect is not due to alterations in intracellular cyclic nucleotide levels in splenocytes.

513,050
AD-A148 842/8/GAR PC **A03/MF A01**
New Jersey Medical School, Newark.
Physiology of Ultradian Rhythms and Their Role in Affecting Disease Resistance.
Final rept. 15 Mar 81-30 Sep 83,
B. H. Natelson, and W. N. Tapp. 1 Oct 83, 40p
Contract DAMD17-80-C-0166

United States military combat personnel will not always be able to maintain normal 24 hr schedules of work and rest. Our laboratory has been studying in what ways biological rhythms interact with some nonstandard light-dark schedules to affect how well an animal functions and how susceptible it is to disease. Contrary to what might be expected, we have found that a number of non-24 hr schedules actually protect rodents from both stress-induced and spontaneously occurring diseases. This phenomenon, which we call 'chronotherapy', may eventually be used to reduce the incidence of disease in stressful situations where the length of the light-dark schedule can be controlled, such as in spacecraft. We hypothesize that these nonstandard light-dark schedules enhance disease resistance by changing the relationships between various behavioral and physiological rhythms. To examine the relationships between rhythms in animals on non-24 hr schedules, we have developed a system which concurrently monitors behavior (motor activity; performance on a vigilance-choice task, feeding) and physiological processes (plasma cortisol; core temperature) in non-human primates.

513,051
DE84702882/GAR PC **A03/MF A01**
International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee.
Survey of Neutron Energy Spectra and Angular Distributions of the sup 9 Be(p,n) sup 9 B Reaction for Fast Neutron Radiotherapy.
M. Allab. Mar 84, 31p INDC(NDS)-153/L
U.S. Sales Only.

Encouraging findings in radiobiology have stimulated a renewed use of fast neutrons in radiotherapy. The physical characteristics required for neutron beams to be suitable for radiotherapy are well established. As a result, the tendency is to replace the previous machines which generated the neutron beams from deuteron bombardment of thick targets (T, Li, Be) by hospital based cyclotrons which accelerate protons on thick beryllium targets. This report surveys the available experimental data of the sup 9 Be(p,n) reaction (cross sections, neutron spectra, yields, mean neutron energies) from the threshold to the proton energy Esub(p)=120 MeV and the works using this reaction in dosimetry measurements, with an emphasis on the data since 1977. (Atomindex citation 15:043205)

513,052
DE85000170/GAR PC **A02/MF A01**
Oak Ridge National Lab., TN.
Nuclear Medicine Progress Report (Oak Ridge National Laboratory) for Quarter Ending June 30, 1984.
F. F. Knapp, K. R. Ambrose, M. M. Goodman, and P. C. Srivastava. Oct 84, 23p ORNL/TM-9343
Contract AC05-84OR21400

Because of the importance of using iodine-123-labeled structurally modified fatty acids for the evaluation of regional differences in myocardial fatty acid uptake to various types of disease, a detailed comparison of the relative myocardial uptake and retention in rats of two model, methyl-branched fatty acids in comparison to the unbranched analogues was evaluated in fasted and unfasted rats. 15-((exp 123 I)iodophenyl)-3-(R,S)-methylpentadecanoic acid (BMIPP) and 15-((exp 125 I)iodophenyl)pentadecanoic acid (IPP) were combined and administered to groups of fasted and unfasted rats. Rats were sacrificed and the tissue distribution of radioactivity evaluated at several time intervals from 2 min to 2 h. In the same manner, 19-(exp 123 I)iodo-3-(R,S)-methyl-18-nonadecenoic acid (BMIVN) and 19-(exp 125 I)iodo-18-nonadecenoic acid (INN) were evaluated in groups of fasted and unfasted rats. These results showed that in unfasted rats the relative heart myocardial clearance and blood levels of the methyl-branched and unbranched fatty acids were similar. In contrast, in fasted rats the straight chain analogues showed a rapid myocardial washout, while the branched analogue showed much longer retention. The subcellular distribution of these radiolabeled fatty acids in heart homogenates obtained after intravenous administration to rats was also evaluated. Under nonfasting conditions the distribution profiles in microsomes, mitochondria and cycloplain were similar. Under fasting conditions, however, there was a shift of the subcellular distribution profile for the straight chain analogue and with a relative amount of radioactivity from the mitochondrial and microsomal fractions. 4 references, 10 figures. (ERA citation 10:003468)

513,053
DE85000552/GAR PC **A03/MF A01**
Pittsburgh Univ., PA.
Effect of Dose Ascertainment Errors on Observed Risk.
J. M. Thompson. 1984, 46p DOE/OR/00033-T77
Contract AC05-76OR00033
Thesis.
Portions are illegible in microfiche products.

Inaccuracies in dose assignments can lead to misclassification in epidemiological studies. The extent of this misclassification is examined for different error functions, classification intervals, and actual dose distributions. The error function model is one which results in a truncated lognormal distribution of the assigned dose for each actual dose. The error function may vary as the actual dose changes. The effect of misclassification on the conclusions about dose effect relationships is examined for the linear and quadratic dose effect models. 10 references, 9 figures, 8 tables. (ERA citation 10:003463)

513,054
DE85001943/GAR PC **A02/MF A01**
Radiation Effects Research Foundation, Hiroshima (Japan).
Delayed Immunologic Effects of Low Dose Radiation in Japanese A-Bomb Survivors. Technical Progress Report.
Takashi Makinodan, and E. T. Bloom. 1984, 9p
DOE/ER/60169-T1
Contract AT03-83ER60169
Portions are illegible in microfiche products.

Progress is reported on a project to analyze the level of circulating immune complexes in atomic bomb survivors. (ERA citation 09:050609)

513,055
HRP-0906044/3/GAR PC **A15/MF A01**
Tennessee Dept. of Health and Environment, Nashville. Bureau of Manpower and Facilities.
Tennessee State Health Plan, 1982-1986. Data Volume.
1983, 342p
Supplement to HRP-0905172.

This Data Volume is a compilation of information and data concerning the health status and its determinants of the people of Tennessee and the various elements of the health care system of the state. The basic premise of this document is that planning and decision-making should be conducted with a careful and systematic use of pertinent, quantitative information. The availability of data makes it possible for the public, health care providers, and government decision-makers to make rational choices, including choices based on values as well as political, social, economic, and historical circumstances. This Data Volume is meant to compliment discussions and negotiations stemming from competing but equally legitimate values, goals, and perspectives which occur at every level of decision-making and policy formulation. The Data Volume is divided into eight chapters as follows: (1) Demographic data; (2) Health status data; (3) Acute care facilities and services data; (4) Long-term care data; (5) Mental health facilities data; (6) Manpower data; (7) Health care cost data; (8) 1984-1988 data update.

513,056
HRP-0906046/8/GAR PC **A22/MF A01**
Delaware Statewide Health Coordinating Council, Dover.
Health Plan for Delaware, 1984.
1984, 520p
Prepared in cooperation with Delaware Health Council, Inc., Wilmington. Sponsored by Department of Health and Human Services, Washington, DC.

As described previously, the Health Plan is a community guide regarding desired changes in health status and in the health care system. Specific uses of the Plan by the Delaware Health Council, Inc. (the Health Systems Agency), the Bureau of Health Planning and Resources Development (the State Health Planning and Development Agency), and the Statewide Health Coordinating Council occur in the performance of the following functions: (1) The establishment of an Annual Implementation Plan, a short range plan designed to achieve priority objectives and recommendations contained in the Plan; (2) The development of specific plans and projects designed to achieve the recommendations contained in the Annual Implementation Plan; (3) The provision of technical assistance to individuals and public and private entities to assist in the development of projects and programs which are necessary to achieve the Plan; (4) The development of recommended projects for the modernization, construction, and conversion of medical facilities in the State, and priorities among such projects; (5) The review of the need for proposed new health services as required by the State Certificate of Need Program, and/or the Federal '1122' Review Program.

513,057
HRP-0906049/2/GAR PC **A19/MF A01**
North Carolina Dept. of Human Resources, Raleigh. Div. of Facility Services.
North Carolina State Health Plan. 1984 State Medical Facilities Plan.
1 Jan 84, 443p
Grant PHS-04-P-000270-05

The State Medical Facilities Plan is developed by the Division of Facility Services, Department of Human Resources, in conjunction with the State Health Coordinating Council. The Plan presents an inventory of health care facilities and services in North Carolina and provides methodologies and need projections for general acute care hospitals (including rehabilitation), long-term care facilities and services (including nursing homes and home health agencies), psychiatric facilities, alcohol and drug facilities, intermediate care facilities for the mentally retarded and end stage renal dialyses stations. Policies that have been developed by the State are presented to inform the reader of the direction in which expansion and modification of the health care system should be guided. These policies, coupled with the methodologies and projections of future need, are used in conjunction with other information in reviewing certificate of need applications for new, expanded, or conversion of health care facilities and services.

513,058
HRP-0906050/0/GAR PC **A03/MF A01**
Pee Dee Regional Health Systems Agency, Inc., Florence, SC.
Annual Implementation Plan for South Carolina Health Service Area 3, 1984-1985.
16 Apr 84, 34p
Grant PHS-04-P-000234-08
See also HRP-0905821.

The Annual Implementation Plan (AIP) is an expression of desired changes during the next twelve months in the health services available in HSA III and in the health status of area residents. The Supplemental Guidance for Development of Health Systems Plans and Annual Implementation Plans, the AIP shall be utilized by the HSA in performing the following functions: (1) The development of specific plans and projects for achieving AIP objectives, (2) The provision of technical assistance, (3) The award of grants or contracts from the Area Health Services Development Funds, (4) The review of proposed uses of Federal funds, (5) The review of the need for proposed new institutional health services, (6) The review of the appropriateness of all institutional health services, and (7) The recommendation to the State agency of projects and priorities for modernization, construction, and conversion of medical facilities.

513,059
HRP-0906055/9/GAR PC **A07/MF A01**
North Central Georgia Health Systems Agency, Inc., Atlanta.

Development, Testing, and Evaluation of Long-Term Care Needs Assessment Methodologies for North Central Georgia (Georgia Health Service Area 3).
Jun 82, 149p
Grant PHS-04-P-000219-06

The North Central Georgia Health Systems Agency (NCG-HSA) is a private, non-profit corporation founded under the National Health Planning and Resource Development Act of 1974 (PL 93-641), and amended by PL 96-79. The agency has responsibility for health planning for a 24-county health service area in Georgia, Area III. The following general categories of needed services will be included in this initial framework: (1) Home Meals, (2) Congregate Meals, (3) Alternative Living Arrangements, (4) Home Health Services, (5) Day Health Care Centers, (6) Rehabilitation Services, (7) Intermediate Care Facility, (8) Skilled Nursing Facility.

513,060
HRP-0906060/9/GAR PC A10/MF A01
Health Council of South Florida, Inc., Miami.
Health Plan for South Florida, District 11, 1984.
1984, 203p

The 1984 District XI Health Plan consists of five components. The first is a demographic, health status and health services profile of the Dade-Monroe District. The others address four different aspects of the Health System in the district: Hospital facilities and services, Nursing home services, Medical rehabilitative services, Maternal and infant care services.

513,061
HRP-0906066/6/GAR PC A06/MF A01
Cordes and Associates, Des Moines, IA.
Delivery of Health Care Services in Rural Iowa,
D. W. Cordes. Jun 84, 104p
See also HRP-0906067.

Delivery of health care services in rural Iowa: Demographic trends; Physician resources; Rural Iowa hospitals 1977 - 1982 - 1983; Options: what can communities do; Cost reduction possibilities; Expanding missions and increasing revenues; Sale of hospital; Broader opportunities for organizing rural health care services; Legal and policy considerations.

513,062
HRP-0906067/4/GAR PC A02/MF A01
Cordes and Associates, Des Moines, IA.
Delivery of Health Care Services in Rural Iowa: Summary Statement.
1984, 16p
See also HRP-0906066.

Purpose of report: The impact of rapid developments occurring in many areas of health care utilization and financing may have an effect on rural Iowa significantly different from the effect on metropolitan communities where many providers of care exist. The Health Policy Corporation of Iowa, therefore, requested the preparation of this report, 'Delivery of Health Care Services in Rural Iowa', aimed at analyses of rural health resources and challenges. Its purposes are: Design; Demographic trends; Physician resources; Hospital capacity; Options for community action; Legal considerations; Needed: Management of health resources.

513,063
HRP-0906101/1/GAR PC A06/MF A01
Indiana State Board of Health, Indianapolis.
Indiana Plan for Health, Fourth Edition, 1982-1987. 1984 Update. Volume 2, Part A. Facilities Portion of the State Health Plan.
1984, 118p
See also HRP-0906103, and HRP-0905308.

This document is part of the Indiana Plan for Health, Fourth Edition (1984 Update). It is a product of the Statewide Health Coordinating Council, a 31-member body appointed by the Governor. It was produced in conjunction with the Indiana State Board of Health. Volume II is the Facilities Portion of the Indiana Plan for Health. This is Part A of Volume II. It contains policies, priorities, goals, and strategies.

513,064
HRP-0906102/9/GAR PC A19/MF A01
Indiana State Board of Health, Indianapolis.
Indiana Plan for Health, Fourth Edition, 1982-1987. 1984 Update. Volume 1, Part B. Information and Analytical Base.
1984, 449p
See also HRP-0906103, and HRP-0905308.

This part of the Indiana Plan for Health, 1984 Update, is the information and data which have been derived from special studies, task force reports, the local health planning agencies, and state-level agencies and/or organizations. This data provides a statewide profile of the health service areas, health status, health service, resource requirements, utilization, and special requirements of areas within the State.

513,065
HRP-0906103/7/GAR PC A18/MF A01
Indiana State Board of Health, Indianapolis.
Indiana Plan for Health, Fourth Edition, 1982-1987. 1984 Update. Volume 1, Part A. Goals, Objectives, Recommended Actions, and Resource Requirements.
18 Apr 84, 402p
See also HRP-0906104, and HRP-0905308.

A basic purpose for the development of the Plan is to provide a sense of direction in the formulation of state policies and programs which will influence the allocation of the approximately $6 billion spent annually for health and health-related services in Indiana. The Plan includes policy statements on: Health expenditures, Health personnel, Medical facilities, Medical research, Data, Guidelines (Review factors), Technologically Innovative Programs and Equipment (TIPE), A community input system for state-level planning.

513,066
HRP-0906104/5/GAR PC A09/MF A01
Indiana State Board of Health, Indianapolis.
Indiana Plan for Health, Fourth Edition, 1982-1987. 1984 Update. Policy Statements, Priorities, and Goals.
18 Apr 84, 179p
See also HRP-0906101, and HRP-0905310.

This Plan is developed under authority given to the Indiana State Board of Health by Indiana Code 16-1-3.3, Section 3, which states that 'the State Board shall carry out health planning and resources development responsibilities and functions within the State'. The purposes of this plan are: (1) To serve as a statement of the commitment to continued improvement of the health of the citizens of Indiana. (2) To serve as a guide to the decision-making processes regarding the selection of priority health needs and the commitment of health resources to meet those needs. (3) To serve as a guide in the review process and decisions regarding need determination and approval of state and federal health expenditures in Indiana. (4) To enhance the efficient use of limited resources. (5) To serve as a realistic guide to foster the good health of all Hoosiers.

513,067
HRP-0906105/2/GAR PC A09/MF A01
North Dakota State Dept. of Health, Bismarck.
North Dakota State Health Plan, 1982-1985.
1984, 195p
Prepared in cooperation with North Dakota Statewide Health Coordinating Council, Bismarck.

This Plan has been prepared by the North Dakota Statewide Health Coordinating Council (SHCC), a group of interested health care consumers and providers who worked together to develop a comprehensive statement of health policy for North Dakota. The Plan outlines the actions that must be taken to reach specific goals for improving the health of North Dakota's citizens and the actions which must be taken to assure that needed health care services are available to all North Dakotans at an affordable cost.

513,068
HRP-0906106/0/GAR PC A25/MF A01
Rhode Island Dept. of Health, Providence.
Rhode Island Health Plan, 1983-1987.
Jan 83, 590p
See also HRP-0905493.

The main purpose of this chapter of the Rhode Island Health Plan is to identify the fundamental problems confronting the health system in Rhode Island and to establish goals for resolving these problems.

513,069
N85-12561/5/GAR PC A07/MF A01
George Washington Univ., Washington, DC.
Nutritional Models for Space Travel from Chemically Defined Diets.
P. A. Dufour. Nov 84, 143p NAS 1.26:3850, NASA-CR-3850
Contract NASW-3165

Human nutritional requirements are summarized, including recommended daily intake and maximum safe chronic intake of nutrients. The biomedical literature on various types of chemically defined diets (CDD's), which are liquid, formulated diets for enteral and total parenteral nutrition, is reviewed. The chemical forms of the nutrients in CDD's are detailed, and the compositions and sources of representative commercial CDD's are tabulated. Reported effects of CDD's in medical patients, healthy volunteers, and laboratory animals are discussed. The effects include gastrointestinal side effects, metabolic imbalances, nutrient deficiencies and excesses, and psychological problems. Dietary factors contributing to the side effects are examined. Certain human nutrient requirements have been specified more precisely as a result of long-term use of CDD's, and related studies are included. CDD's are the most restricted yet nutritionally complete diets available.

513,070
PB84-922803/GAR PC$8.00/MF A01
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Adjuvant Chemotherapy of Osteosarcoma.
Oncology overview.
Nov 84, 65p NCI/ICRDB/OT-84/03

Oncology Overviews are a service of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute, intended to facilitate and promote the exchange of information between cancer scientists by keeping them aware of literature related to their research being published by other laboratories throughout the world. Each Oncology Overview represents a survey of the literature associated with a selected area of cancer research. It contains abstracts of articles which have been selected and organized by researchers associated with the field. Contents: Primary surgery and the natural history of osteosarcoma; Surgical resection of pulmonary metastases in osteosarcoma; Primary chemotherapy of advanced osteosarcoma; Postoperative adjuvant chemotherapy of osteosarcoma; Preoperative adjuvant chemotherapy of osteosarcoma; Reviews of adjuvant chemotherapy of osteosarcoma.

513,071
PB84-922804/GAR PC$8.00/MF A01
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Radiolabeled Antibodies in Cancer.
Oncology overview.
Nov 84, 63p NCI/ICRDB/OT-84/04

Oncology Overviews are a service of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute, intended to facilitate and promote the exchange of information between cancer scientists by keeping them aware of literature related to their research being published by other laboratories through the world. Each Oncology Overview represents a survey of the literature associated with a selected area of cancer research. It contains abstracts of articles which have been selected and organized by researchers associated with the field. Contents: Radiolabeled antibodies--labeling and imaging techniques; Radiolabeled antibodies--carcinoembryonic antigen; Radiolabeled antibodies--alpha-fetoprotein; Radiolabeled antibodies--human chorionic gonadotropin; Radiolabeled antibodies--ferritin; Radiolabeled antibodies--imaging of colorectal tumors; Radiolabeled antibodies--imaging of malignant melanoma; Radiolabeled antibodies--imaging of urogenital tumors; Radiolabeled antibodies--imaging of thyroid tumors; Radiolabeled antibodies--other clinical studies; Radiolabeled antibodies--selected preclinical studies; Radiolabeled antibodies--reviews.

513,072
PB84-922805/GAR PC$6.50/MF A01
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.

Neuropsychiatric Assessment and Care of Cancer Patients.
Oncology overview.
Nov 84, 47p NCI/ICRDB/OT-84/05

Oncology Overviews are a service of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute, intended to facilitate and promote the exchange of information between cancer scientists by keeping them aware of literature related to their research being published by other laboratories throughout the world. Each Oncology Overview represents a survey of the literature associated with a selected area of cancer research. It contains abstracts of articles which have been selected and organized by researchers associated with the field. Contents: Neuropsychiatry-oncology interface--the issues; Assessment and treatment of neuropsychiatric disorders in cancer patients--depression as symptom and syndrome; Neuropsychiatric manifestations of cancer--tumor psychogenicity; Neuropsychiatric evaluation of pain in cancer patients; Neuropsychiatric evaluation of emesis in cancer patients; Neuropsychiatric effects of cancer therapies--treatment psychogenicity; Psychoneuroimmunology--stress and cancer; Neuropsychiatry and terminal care--a medical approach to symptom control.

513,073
PB84-922806/GAR PC$11.00/MF **A01**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Diagnosis and Treatment of Ovarian Cancer.
Oncology overview.
Nov 84, 106p NCI/ICRDB/OT-84/06

Oncology Overviews are a service of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute, intended to facilitate and promote the exchange of information between cancer scientists by keeping them aware of literature related to their research being published by other laboratories throughout the world. Each Oncology Overview represents a survey of the literature associated with a selected area of cancer research. It contains abstracts of articles which have been selected and organized by researchers associated with the field. Contents: Radiological diagnosis of ovarian cancer; Pathology, morphology and prognosis of ovarian cancer; Biological and immunological markers of ovarian cancer; Surgical treatment of ovarian cancer; Chemotherapy of ovarian cancer; Other treatment modalities for ovarian cancer; Etiology and epidemiology of ovarian cancer; Preclinical studies of human ovarian cancer cell lines.

513,074
PB84-922807/GAR PC$11.00/MF **A01**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Biological, Hormonal and Immunological Markers in Breast Cancer Patients.
Oncology overview.
Dec 84, 101p NCI/ICRDB/OT-84/07

Oncology Overviews are a service of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute, intended to facilitate and promote the exchange of information between cancer scientists by keeping them aware of literature related to their research being published by other laboratories throughout the world. Each Oncology Overview represents a survey of the literature associated with a selected area of cancer research. It contains abstracts of articles which have been selected and organized by researchers associated with the field. Contents: Carcinoembryonic antigen (CEA) in breast cancer patients; Enzyme markers in breast cancer patients; Steroid and protein hormones in breast cancer patients; Steroid hormone receptors in breast cancer patients; Immunological markers in breast cancer patients; Miscellaneous biomarkers in breast cancer patients.

513,075
PB85-134906/GAR PC **A03**/MF **A01**
Charles R. Drew Postgraduate Medical School, Los Angeles, CA.
Providing Basic Medicines in Rural Primary Health Care Projects in Africa: Technical Guidelines,
R. C. King. 3 Nov 81, 43p AID-PN-AAL-324
Contract AID/afr-C-00-1092-00
Prepared in cooperation with Martin Luther King, Jr. Hospital, Los Angeles, CA.

Inadequate attention to appropriate selection, distribution, and use of basic medicines in A.I.D. primary health care (PHC) activities in developing countries has often hindered implementation of PHC projects. This report provides general guidelines for project staff on the implementation and evaluation of these projects which include pharmaceutical supply components, and provides a perspective on the conceptual framework of the drug supply sector. Successful general strategies and techniques are presented, focusing on provision of basic medicines, and a geographic orientation toward Africa.

513,076
PB85-137214/GAR PC **A03**/MF **A01**
Northwestern Univ., Evanston, IL. Center for Health Services and Policy Research.
Evaluation of a Long Term Home Care Program. Executive Summary,
Working paper 1 Jul 78-30 Jun 80.
S. L. Hughes, D. S. Cordray, and V. A. Spiker. Jul 83, 41p WP-62, NCHSR-84/236
Grant PHS-HS-03152
Revision of report dated May 1982. Sponsored by Robert Wood Johnson Foundation, Princeton, NJ.

This document reports the outcome of a nine month evaluation of the Five Hospital Homebound Elderly Program, a model long term, comprehensive, coordinated home care program in Chicago. Outcomes assessed include the mortality, comprehensive functional status, rates of hospitalization and of institutionalization of the elderly (X age 80.4), chronically impaired population served by the Five Hospital Homebound Elderly Program. The evaluation utilized a quasi-experimental, pre-posttest design with a non-equivalent control group consisting of similarly elderly and impaired subjects who received OAA Title III-c home delivered meals. Consecutively accepted experimental (n = 122) and control group clients (n = 123) were interviewed using the Duke/OARS Multidimensional Functional Assessment Questionnaire at time of acceptance to service and nine months later. Service utilization data were also obtained for both groups in order to correlate client outcomes and characteristics with level and type of services used. Data collection took place over a 31 month period.

513,077
PB85-138121/GAR PC **A02**/MF **A01**
National Center for Health Services Research, Rockville, MD.
Annotated Bibliography of the Long-Term Care Studies Program.
1984, 12p NCHSR-84/227

This document is an annotated bibliography of the Long-Term Care Studies Program of the Division of Intramural Research, National Center for Health Services Research. This compilation serves as a reference source for NCHSR staff and others interested in health services research.

513,078
PB85-138147/GAR PC **A02**/MF **A01**
National Center for Health Services Research, Rockville, MD.
Annotated Bibliography of the Health Status and Health Promotion Studies Program.
1984, 16p NCHSR-84/228

This document is an annotated bibliography of the Health Status and Health Promotion Studies Program of the Division of Intramural Research, National Center for Health Services Research. This compilation serves as a reference source for NCHSR Staff and others interested in health services research.

513,079
PB85-138154/GAR PC **A03**/MF **A01**
National Center for Health Services Research, Rockville, MD.
DRGs (Diagnosis Related Groups) and Disease Staging for Reimbursing Medicare Patients. Hospital Studies Program Working Paper Number 1,
Working paper no. 1,
R. M. Coffey, and M. G. Goldfarb. Oct 84, 37p NCHSR-84/225

Beginning October 1, 1983 Medicare began reimbursing many hospitals on the basis of a set of fixed fees tied to Diagnosis Related Groups (DRGs). Using 1979-1981 Maryland data for Medicare patients, this paper compares the DRG system with the Disease Staging patient classification system in terms of (1) structure, (2) explanation of resource consumption (length of stay) of hospital patients, and (3) impact on reimbursement by type of hospital. The two systems generate substantially different reimbursements by type of hospital. Surprisingly, large hospitals (including urban, not-for-profit, teaching hospitals) fare better under a DRG-based reimbursement system than under Disease Staging, a severity-of-illness system that excludes procedures as a basis of classification. These results imply that reimbursement policy based on Disease Staging would create disincentives to perform surgery compared to the current DRGs.

513,080
PB85-139939/GAR PC **A09**/MF **A01**
Pennsylvania Univ., Philadelphia. Center for the Study of Emergency Health Services.
Effect of Telemetry on Advanced Life Support Care: Final Report and Executive Summary.
Rept. for 30 Sep 79-31 Aug 83,
C. G. Cayten, J. Oler, K. Walker, J. Murphy, and J. Morganroth. Apr 84, 180p NCHSR-84/239
Grant PHS-HS-03555

A three year controlled trial of telemetry use in the prehospital care of cardiac patients was conducted in Philadelphia. Telemetry was not found to affect the ability of paramedics to interpret EKGs in either test or field situations. Ninety-six percent of the paramedics who used telemetry reported that it had not helped them save a single life; 86 percent disputed the proposition that it saved them time in cardiac patient care. It was felt that telemetry was most useful in treating heart block, but not useful in over 90 percent of the life-threatening cases treated. Paramedics who used telemetry spent more time in the field with their patients exclusive of transport time than did paramedics without telemetry. No statistically significant effect of telemetry on the rate of survival of V-F patients was found.

513,081
PB85-140226/GAR PC **A05**/MF **A01**
American Public Health Association, Washington, DC.
Strategy to Strengthen the National Health System in Mauritania, West Africa,
R. Delgado-Garcia. 13 Sep 82, 93p AID-PN-AAL-632
Contract AID/DSPE-C-0053

To help the Mauritanian Ministry of Health fulfill the goal of the 1981-85 National Development Plan to expand health services to the rural majority, a consultant was invited to participate in a workshop to develop a simplified health information system (HIS). This report focuses on the consultant's recommendations in six critical areas: (1) defining HIS objectives; (2) selecting the kinds of data to be gathered continuously; (3) designing appropriate weekly, monthly, and quarterly forms for data collection; (4) designing procedures to store, record, process, and analyze data according to specific needs; (5) identifying the major constraints affecting the HIS; (6) and choosing a progressive, step-by-step strategy for implementing the HIS. The final contribution of the consultant, who also trained appropriate Mauritanian personnel in the use of the simplified HIS, was to completely revise the policy, methods, and procedures of the Rural Medical Assistance Project and to evaluate the project's research component.

513,082
PB85-143477 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Amplitude Analysis of Pancreatic B-Scans: A Clinical Evaluation of Cystic Fibrosis.
Final rept.,
T. A. Shawker, S. I. Parks, M. Linzer, B. Jones, and L. A. Lester. 1980, 12p
Pub. in Ultrason. Imaging 2, n1 p55-66 Jan 80.

Ultrasonic B-scan images of the pancreatic parenchyma in normal and cystic fibrotic patients were numerically analyzed. Images of both the maximum and minimum echoes from the tissue were generated by a recently-developed digital ultrasound system. Complete segregation of the two groups was achieved by averaging the echo amplitude over a selected region in the image. The dependence of the numerical values on the B-scan imaging mode, transducer properties, dynamic range compression curve, and operator scanning technique is discussed in depth.

513,083
PB85-149151/GAR PC$7.00/MF **A01**

Centers for Disease Control, Atlanta, GA. Lab. Program Office.
Laboratory Methods for Diagnosing Respiratory Virus Infections: Course No. 8240-C,
H. C. Ballew, H. C. Lyerla, and F. T. Forrester. Oct 84, 170p

The manual serves as a ready reference for clinical and diagnostic laboratories interested in identifying viruses causing respiratory infections. Detailed procedural guides for both conventional and rapid laboratory identification methods are provided. The six-part text covers: respiratory properties and clinical symptoms; introduction to viral diagnosis; isolation of respiratory viruses; identification of respiratory viruses, interpretation of serologic results, and reagent preparation. Identification procedures are included for influenza viruses, parainfluenza viruses, adenoviruses, rhinoviruses, corona viruses, measles virus, mumps virus, herpes viruses, and certain echoviruses and coxsackie viruses. Mock-up test results allow the user to read, make conclusions and interpretate various virus test procedures. General and specific questions about respiratory virus identification are also provided.

513,084

PB85-150332/GAR PC **A99**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Environmental Criteria and Assessment Office.
Health Assessment Document for Chlorinated Benzenes. Final Report,
W. B. Peirano. Jan 85, 606p EPA/600/8-84/015F

The chlorinated benzenes are a group of 12 compounds (monochlorobenzene; 1,2-, 1,3-, 1,4-dichlorobenzene; 1,2,3-, 1,2,4-, 1,3,5-trichlorobenzene; 1,2,3,4-, 1,2,3,5-, 1,2,4,5-tetrachlorobenzene; pentachlorobenzene; and hexachlorobenzene). Environmental contamination results from emissions to air and water during the manufacture and use of the chlorinated benzenes and from the disposal of wastes from a number of processes. These compounds are resistant to chemical and biological degradation and tend to accumulate in lipid-containing tissues of animals and humans. The ubiquitous environmental distribution of the chlorinated benzenes and their bioconcentration in humans are a basis for concern over the consequences of chronic exposure to human health. The first portion of the health assessment document is devoted to the chlorinated benzenes in the environment: physical and chemical properties, the monitoring of the chlorinated benzenes in various media, natural and human-made sources, the transport and distribution of the chlorinated benzenes within environmental media, and the levels of exposure. The second part is devoted to biological responses in laboratory animals and humans including metabolism, pharmacokinetics, as well as the toxicological effects of the chlorinated benzenes. This document forms the scientific basis for a proposed decision by EPA concerning the regulation of the Chlorinated Benzenes under the Clean Air Act.

513,085

PB85-854602/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Health Maintenance Organizations and Health Care Costs. 1974-January 1985 (Citations from the Management Contents Data Base).
Rept. for 1974-Jan 85.
Jan 85, 190p
Supersedes PB84-857218.

This bibliography contains citations concerning the basic operations, subscriber attitudes, benefits, and limitations of Health Maintenance Organizations (HMO). Comparison of HMO and fee-for-service practice is noted, and consideration of cost containment in health care through the HMO is discussed. Specific HMO operations are presented and their financial, marketing, and management practices are considered. Government regulations are also discussed. (This updated bibliography contains 326 citations, 111 of which are new entries to the previous edition.)

513,086

SHR-0010567/GAR PC **A05**/MF **A01**
Denver Research Inst., CO. Social Systems Research and Evaluation Div.
Board and Care for Elderly and Mentally Disabled Populations. Volume 1. Appendix-Data Collection Instruments.
Final rept.,
N. D. Dittmar, G. P. Smith, J. C. Bell, C. B. C. Jones, and D. L. Manzanares. Mar 83, 96p
Contract DHHS-100-79-0117
See also PB83-235721, SHR-0010581, SHR-0010585, and SHR-0010605.

This appendix to the first volume of a six-volume report contains the data collection instruments used in the study of board and care homes in seven States. The instruments include the facility and provider interview, a facility assessment interview, a behavioral checklist, and a resident interview. The volume also presents a resident assessment form, a family interview, and a service delivery system interview. All of these instruments were used to gather information from 764 operators of board and care homes; 3,953 residents; 712 family members; and about 150 service providers.

513,087

SHR-0010583/GAR PC **A12**/MF **A01**
Denver Research Inst., CO. Social Systems Research and Evaluation Div.
Board and Care for Elderly and Mentally Disabled Populations. Volume 3. Board and Care Regulations.
Final rept.
Mar 83, 255p
Contract DHHS-100-79-0117
See also SHR-0010567, SHR-0010581, SHR-0010582, SHR-0010584, SHR-0010585, SHR-0010567, SHR-0010605. Prepared in cooperation with Boston Univ., MA.

Board and care regulations in 34 States presumed to be in compliance with the Keys Amendment are analyzed. The study found that requirements in many sets of regulations needed to be expanded and tightened. Regulations governing homes for mentally retarded persons were usually more specific than other sets of regulations. Improvements in some sets of regulations are needed. For instance, greater emphasis should be placed on habilitation and the development of individual service plans for elderly and mentally ill residents. Greater efforts should be made to assure that homes maintain the licensing standards and manager and employees have adequate financial and professional qualifications. In addition, long-term needs of residents should be given attention. Greater specificity and strong assurances are needed in the critical areas of client protection, client rights, and the provision of appropriate services. Thirteen content areas were investigated in the study, including licensing, facility identification, inspection and compliance, enforcement, operating principles, personnel policies, staff training, client record, client protection and client rights, health services and procedures, individual service plans, and habilitation services.

513,088

SHR-0011026/GAR PC **A04**/MF **A01**
Center for Human Services, Washington, DC.
To Increase the Usefulness and Utilization of Needs Assessment for Purposes of Policy Formulation, Planning, Program/Services Development and Advocacy.
Final rept.,
N. LaCharite, R. Ryan, P. Gualtieri, and V. Barocas. Mar 81, 67p
Grant AOA-90-AR-2107
See also SHR-0011025.

A project to assist state and area agencies on aging expand the use of needs assessment in policy formulation, planning, program and services development, and advocacy operations is described. The project's background, purpose, design, results, and products are described, and recommendations are offered, based on field reviews. Project objectives include the following: to develop a typology of approaches for assessing the program and service needs of older persons; to evaluate the usefulness of different types of needs assessment data; to determine under what circumstances different types of needs assessments should be used; to determine whether legislative and regulatory requirements governing the conduct of needs assessment by state and area agencies should be changed; and to develop instructional/training materials on needs assessment for agency staff. To accomplish these objectives, a review of federal, state, and area agencies was conducted, and in-depth case studies were developed to determine successful and unsuccessful utilization of needs assessment results. Regional workshops were held to instruct participants on the use of instructional and training materials. Recommendations include the following: the Administration on Aging (AOA) should not change the regulatory provision requiring agencies on aging to conduct needs assessments as part of their plan development: and AOA should clarify the needs assessment process.

513,089

SHR-0011544/GAR PC **A02**/MF **A01**
Temple Univ., Philadelphia, PA.
Handy Reference to Developmental Disabilities: Definitions, Jargon and Acronyms Programs and Legislation,
M. Piccoli. 1984, 19p
Sponsored in part by Department of Health and Human Services, Washington, DC.

Developmental disability is defined and various conditions, including autism, cerebral palsy, epilepsy, and mental retardation are addressed. Some commonly used terms, such as accessibility, aftercare, advocacy, diagnostic services, early intervention, incompetency, and right to treatment, are explained. Acronyms such as ANSI (American National Standards Institute), CLA (Community Living Arrangement), and OT (Occupational Therapy) are spelled out. Various programs for the developmentally disabled are described, including respite care, foster care, and sheltered employment programs. Key legislation is considered, and several legal cases that have affected the rights of disabled individuals are examined (for instance, Wyatt versus Stickney, O'Connor versus Donaldson, and Halderman Versus Pennhurst).

6F. Environmental Biology

513,090

DE85001810/GAR PC **A02**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Plant Biology.
Effect of Elevated Atmospheric CO sub 2 on Plant Communities. Final Report.
F. A. Bazzaz. Oct 84, 20p DOE/EV/04329-4
Contract AC02-77EV04329
Portions are illegible in microfiche products.

We have studied the effects of elevated atmospheric carbon dioxide on communities of colonizing annual plants, crop plants, and deciduous forest trees. We observe differential effects on different species with regard to growth, biomass, phenology, resource allocation, photosynthesis, water-use efficiency, flowering, and fruiting. We conclude that competitive relations among plants are likely to change as global atmospheric CO sub 2 increases, and that therefore there will be longterm changes in the composition of natural communities. More research will be necessary before any but the very broadest conclusions can be made about what direction these community changes are likely to take. 10 references, 9 figures. (ERA citation 10:003253)

513,091

PB84-921900/GAR Subscription
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Pesticide Product Information on Microfiche, Sets A and B.
Rept. for 1970-84.
Apr 84, 844p EPA/540/9-84/005
Supersedes PB83-921900. Includes Pesticide Product Information on Microfiche: A User's Guide (9th Edition).
Microfiche available on Subscription, North American Continent price $150.00/year; all others write for quote.

Since 1970 when the U.S. Environmental Protection Agency (EPA) was given the responsibility of regulating all aspects of pesticides, the Agency has amassed, through the registration process, an extensive computer data system on most Federally registered pesticide products. The information includes product names, manufacturers' names and addresses, active chemical ingredients, tolerances for residues, and site and pest information for particular products and active chemical ingredients. Set A contains the Product Manager as-

signments; Pesticide Products, numerically and alphabetically; Pesticide Companies, numerically and alphabetically, Chemical Reference file, alphabetically and numerically; Tolerance File by chemical and commodity; Inverted Chemical/Registration Number; and Pesticide Label Data. Set B contains Site/Pest Data organized into the site name/pest name/chemical/registration number and chemical/site name/pest name/registration number fiche sets. Each set is further divided into the five major pesticide disciplines: herbicides, algaecides and growth regulators; antimicrobials and protozoa; insecticides, acaricides, molluscicides and antifouling compounds; fungicides and nematicides; and rodenticides and technical grade chemicals.

513,092
PB84-922000/GAR Subscription
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Pesticide Product Information on Microfiche, Set A.
Rept. for 1970-84.
Apr 84, 80p EPA/540/9-84/006
Supersedes PB83-922000. Includes Pesticide Product Information on Microfiche: A User's Guide (9th Edition).
Microfiche available on Subscription, North American Continent price $40.00/year; all others write for quote. Also available with Set B as PB84-921900.

Since 1970 when the U.S. Environmental Protection Agency (EPA) was given the responsibility of regulating all aspects of pesticides, the Agency has amassed, through the registration process, an extensive computer data system on most Federally registered pesticide products. The information includes product names, manufactures' names and addresses, active ingredients, tolerances for residues, and site and pest information for particular products and active chemical ingredients. Set A contains the Product Manager assignments; Pesticide Products, numerically and alphabetically; Pesticide Companies, numerically and alphabetically; Chemical Reference file, alphabetically and numerically; Tolerance File by chemical and commodity; Inverted Chemical/Registration Number; and Pesticide Label Data.

513,093
PB85-137933/GAR PC **A07**/MF **A01**
International Rice Research Inst., Los Banos, Laguna (Philippines).
Manual for Testing Insecticides on Rice,
E. A. Heinrichs, S. Chelliah, S. L. Valencia, M. B. Arceo, and L. T. Fabellar. 1981, 143p AID-PN-AAL-745, AID-PN-AAL-745
Color illustrations reproduced in black and white.

Insecticides are essential tools in controlling rice insect pests. This manual presents insecticide evaluation methods developed and tested at the International Rice Research Institute over 15 years. It discusses the planning of insecticide evaluation studies, the rearing of test insects, and the techniques used to evaluate insecticides in the laboratory, insectary, and field. It explains in detail the methodology used in the laboratory and insectary to determine the resistance levels of insects to insecticides and the relative toxicity of insecticides such as contact and stomach poisons and fumigants.

513,094
PB85-146371/GAR PC **A02**/MF **A01**
Health Effects Research Lab., Cincinnati, OH.
Occurrence of Viruses in Treated Drinking Water in the United States.
Journal article,
E. W. Akin. 1984, 15p EPA/600/J-84/161
Pub. in Water Science and Technology, v17 p689-700 1984.

Health concerns regarding waterborne transmission of enteric viruses began to develop around 1940 in the United States (U.S.) with the isolation of poliovirus from human feces and sewage. The implication of these isolations for the transmission of viral disease through contaminated drinking water stimulated research on methodology for virus detection, recovery and assessment from water. Although virus methods research is still an important area of study, relatively sensitive procedures became available during the past decade for recovering many enteric virus types from large-volume samples of drinking water. Controversy surrounded many of the early reported isolations of viruses from treated drinking water using these procedures due to the suspicion of laboratory contamination.

6H. Food

513,095
DE85002319/GAR PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Chemical Form of Technetium in Corn (Zea Mays) and the Gastrointestinal Absorption of Plant-Incorporated Tc by Laboratory Rats.
C. T. Garten, C. Myttenaere, C. M. Vandecasteele, R. Kirchmann, and R. Van Bruwaene. 1984, 21p CONF-8410157-3
Contract AC05-84OR21400
Scientific seminar on the behavior of technetium in the environment, Cadarache, France, 23 Oct 1984, Portions are illegible in microfiche products.

The food chain availability of technetium incorporated into plant tissue, its chemical form in corn leaves, and the potential for gastrointestinal absorption of plant-incorporated technetium was investigated. Technetium-95m was incorporated into corn leaves via root uptake. Chemical fractionation of the /sup 95m/Tc in leaves showed that 60% was extractable with boiling ethanol and weak mineral acids. The remainder was associated with cell walls and was extractable by harsh chemical treatment. Gel permeation chromatography of the cytosol, indicated that 50% of the /sup 95m/Tc cochromatographed with anionic pertechnetate; however, it was impossible to distinguish if this pure pertechnetate or technetium complexed with organic molecules. Technetium-95m was administered to laboratory rats in a single dose as: (1) intravenous injection of pertechnetate, (2) pertechnetate mixed with standard laboratory food, and (3) a meal containing /sup 95m/Tc biologically incorporated into corn leaves. High concentrations of /sup 95m/Tc were found in the thyroids, hair, kidneys, and liver of rats. Technetium rapidly disappeared from the liver, kidneys, and other tissues, but remained in the thyroids and hair. Urinary excretion of technetium decreased, and fecal excretion increased when technetium was fed to rats as a /sup 95m/Tc incorporated into corn leaves. The percent of the administered dose absorbed into thyroid gland and the kidneys was less when technetium was biologically incorporated into corn leaves than when pertechnetate was mixed with food. Biological incorporation of technetium into plants appears to reduce its potential for food chain transfer by decreasing its availability for gastrointestinal absorption. 5 references, 4 figures, 3 tables. (ERA citation 10:003323)

513,096
DE85002501/GAR PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Transfer of Sup 131 I and /Sup 95M/Tc from Pasture to Goat Milk.
E. A. Bondietti, and C. T. Garten. 1984, 16p CONF-8410157-4
Contract AC05-84OR21400
Scientific seminar on the behavior of technetium in the environment, Cadarache, France, 23 Oct 1984.
Portions are illegible in microfiche products.

Field measurements were made in 1983 on the transfer of sup 131 I and /sup 95m/Tc from spray-contaminated pasture to goat's milk. The transfer of sup 131 I to milk was similar to that used for mathematical models in US Nuclear Regulatory Commission Regulatory Guide 1.109, which was derived from stall-feeding experiments using capsulized doses. Compared to exp 131 I, the /sup 95m/Tc transferred to milk was about 5600 times less. The lower transfer resulted from both immobilization of technetium on pasture prior to ingestion as well as reduced gastrointestinal absorption. The results show that the food chain transfer of technetium to milk is much less than that previously expected based on inferences made from metabolism studies. 6 references, 4 figures, 1 table. (ERA citation 10:003324)

513,097
PB85-136307/GAR PC **A04**/MF **A01**
Gotsch Associates, Inc., Palo Alto, CA.
Using Microcomputers to Improve the Management of Food Security Systems.
Final rept.
15 Nov 82, 56p AID-PN-AAL-764/68
Contract AID/DSAN-C-0251

Despite progress in broadening the perspective on food policy, relatively little discussion has been devoted to the actual management of food security systems. This study examines food management from three perspectives. An initial discussion of pertinent substantive issues reveals the need for quantitative techniques in reducing the uncertainty facing food managers in regard to the size and location of food inventories, mobilizing human and logistical resources in time of crisis, etc. The second section focuses on new microcomputer technology in its capacity as a management tool. The third section centers on the process by which this relatively sophisticated technology can be transferred to the managers of the system.

513,098
PB85-137115/GAR PC **A06**/MF **A01**
Esvelt Environmental Engineering, Spokane, WA.
Health Effect Potential of Reusing Treated Fruit Processing Wastewater within a Cannery.
Final rept. Sep 80-Dec 82,
L. A. Esvelt, and H. H. Hart. Nov 84, 105p EPA/600/1-84/029
Prepared in cooperation with Snokist Growers Cannery, Yakima, WA.

Reclamation of fruit processing wastewater by biological treatment, granular media filtration, and disinfection with chlorine, and reuse of the reclaimed wastewater for fruit washing and conveying, and for direct contact container cooling, was investigated over three seasons for its health effect implications. It was concluded that the reclaimed effluent had no adverse effect on product quality. It is recommended that this technology be applied to other processing plants for high acid foods packed in sealed containers, with certain safeguards to protect product quality. It was recommended that application of this technology to plants processing low acid foods be initiated, with additional care and attention to reclaimed water quality.

513,099
PB85-141059/GAR PC **A21**/MF **A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Aliphatic Ketones, Secondary Alcohols and Related Esters in Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Mar 84, 478p FEMAUS-84/01, A-1
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-265 512.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Aliphaic ketones, secondary alcohols and related esters.

513,100
PB85-141067/GAR PC **A99**/MF **A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Alicyclic Compounds of Carbon, Hydrogen and Oxygen on Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Mar 84, 621p FEMAUS-84/02, A-5
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-265 515.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Alicyclic compounds of carbon, hydrogen and oxygen.

513,101
PB85-141075/GAR PC **A05**/MF **A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Aliphatic Thiols in Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Mar 84, 85p FEMAUS-84/03, A-8
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-265 518.Portions of this document are not fully legible.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Aliphatic thiols.

513,102
PB85-141083/GAR PC **A10**/MF **A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Propylene Glycol, Glycerol and Related Substances in Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Mar 84, 224p FEMAUS-84/04, B-1A
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-265 519.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Propylene glycol, glycerol and related substances.

513,103
PB85-141091/GAR PC **A07**/MF **A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Aliphatic Keto- and Hydroxy-Acids with Oxygen Functions and Related Compounds in Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Feb 84, 127p FEMAUS-84/05, B-1B
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-265 520.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Aliphatic keto- and hydroxy-acids with nonadjacent oxygen functions and related compounds.

513,104
PB85-141109/GAR PC **A09**/MF **A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Aliphatic Lactones in Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Mar 84, 186p FEMAUS-84/06, B-1C
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-265 521.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Aliphatic lactones.

513,105
PB85-141117/GAR PC **A05**/MF **A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Aliphatic Polyhydroxy Compounds and Derivatives in Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Mar 84, 90p FEMAUS-84/07, B-1F
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-265 424.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Aliphatic polyhydroxy compounds and derivatives.

513,106
PB85-141125/GAR PC **A07**/MF **A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Amino Acids in Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Mar 84, 149p FEMAUS-84/08, B-3
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-265 526.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Amino acids.

513,107
PB85-141133/GAR PC **A07**/MF **A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Mono-, Di-, and Trisulfides in Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Jan 84, 133p FEMAUS-84/09, B-4
Revision of report dated Oct 83. Supersedes PB-265 527. Sponsored in part by Food and Drug Administration, Rockville, MD.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Aliphatic mono-, di-, and trisulfides.

513,108
PB85-141141/GAR PC **A05**/MF **A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Primary Alcohols, Aldehydes, Acids and Related Esters with Thiol or Sulfide Functions in Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Feb 84, 90p FEMAUS-84/10, B-5A
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-265 528.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Primary alcohols, aldehydes, acids and related esters with thiol or sulfide functions.

513,109
PB85-141158/GAR PC **A04**/MF **A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Selected Oxygenated Derivities of Mercaptans and Sulfides in Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Dec 79, 73p FEMAUS-84/11, B-5B
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-265 529.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Selected oxygenated derivatives of mercaptans and sulfides.

513,110
PB85-141166/GAR PC **A04**/MF **A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Aliphatic Thiol Esters in Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Feb 84, 52p FEMAUS-84/12, B-5C
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-265 530.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Aliphatic thiol esters.

513,111
PB85-141174/GAR PC **A09**/MF **A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Substituted Pyrazines in Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Jan 84, 197p FEMAUS-84/13, B-6
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-265 531.Portions of this document are not fully legible.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Substituted pyrazines.

513,112
PB85-141182/GAR PC **A07**/MF **A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Salicylates and Salicylaldehyde in Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Jan 84, 130p FEMAUS-84/14, C-3
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-291 115.Portions of this document are not fully legible.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Salicylates and salicylaldehyde.

513,113
PB85-141190/GAR PC **A04**/MF **A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Aryl Substituted Tertiary Alcohols and Esters in Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
1984, 73p FEMAUS-84/15, C-4
Revision of report dated Oct 83. Supersedes PB-283 503. Sponsored in part by Food and Drug Administration, Rockville, MD.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Aryl substituted tertiary alcohols and esters.

513,114
PB85-141208/GAR PC **A06**/MF **A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Aromatic Thiols and Sulfides in Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Dec 83, 102p FEMAUS-84/16, C-5
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-283 500.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Aromatic thiols and sulfides.

513,115
PB85-141216/GAR PC **A14**/MF **A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Benzyl Alcohol, Benzaldehyde, Benzoic Acid and Related Compounds in Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Feb 84, 322p FEMAUS-84/17, C-9
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-291 106.Portions of this document are not fully legible.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Benzyl alcohol, benzaldehyde, benzoic acid and related compounds.

513,116
PB85-141224/GAR PC **A22**/MF **A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Phenols in Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Jan 84, 519p FEMAUS-84/18, C-12
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-296 002.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Phenols.

513,117
PB85-141232/GAR PC **A09**/MF **A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.

Scientific Literature Review of Pyridine and Related Substances In Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Dec 83, 198p FEMAUS-84/19, D-2
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-296 005.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Pyridine and related substances.

513,118
PB85-141240/GAR PC **A04/MF A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Furanones and Related Substances In Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Dec 83, 73p FEMAUS-84/20, D-9
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-291 107.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Furanones and related substances.

513,119
PB85-141257/GAR PC **A05/MF A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Selected Tetrahydrofurans In Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Dec 83, 79p FEMAUS-84/21, D-11
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-291 116.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Selected tetrahydrofurans.

513,120
PB85-141265/GAR PC **A05/MF A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Aliphatic Ethers In Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Dec 83, 94p FEMAUS-84/22, D-12
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-291 118.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Aliphatic ethers.

513,121
PB85-141273/GAR PC **A07/MF A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Sulfur Derivatives of Furans In Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
1984, 139p FEMAUS-84/23, D-14
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-291 119.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Sulfur derivatives of furans.

513,122
PB85-141281/GAR PC **A09/MF A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Thiazole and Related Substances in Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Nov 83, 195p FEMAUS-84/24, D-16
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-296 012.Portions of this document are not fully legible.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Thiazole and related substances.

513,123
PB85-141299/GAR PC **A11/MF A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Miscellaneous Nitrogen Compounds In Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Nov 83, 247p FEMAUS-84/25, D-19
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-296 006.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Miscellaneous nitrogen compounds.

513,124
PB85-141307/GAR PC **A06/MF A01**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Miscellaneous Substances In Flavor Usage. Volume 1. Introduction and Summary, Tables of Data, Bibliography.
Oct 83, 119p FEMAUS-84/26, D-23
Contract FDA-223-74-2224
Revision of report dated Oct 83. Supersedes PB-296 008.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Miscellaneous substances.

513,125
PB85-141315/GAR PC **A99/MF E10**
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
Scientific Literature Review of Aliphatic Primary Alcohols, Esters, and Acids In Flavor Usage. Volumes 1 through 7.
Mar 84, 2426p FEMAUS-84/27, M-1
Revision of report dated Oct 83. Supersedes PB-254 973-SET. Sponsored in part by Food and Drug Administration, Rockville, MD.Portions of this document are not fully legible.

This Scientific Literature Review includes specifications, safety data, poundage data, natural occurrence information, chemical identities and other data on Aliphatic primary alcohols, aldehydes, esters and acids.

513,126
PB85-145282 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Radiation Chemistry of Water-Soluble Food Components.
Final rept.,
M. G. Simic. 1983, 73p
Pub. in Chapter 9, Preservation of Food by Ionizing Radiations, p1-73 1983.

Radiation chemistry of water-soluble food components has been reviewed and deals with state of art in radiation preservation of food. It covers kinetics and mechanisms of water free radical (e(-1)(sub aq), OH, H) reactions with (a) amino acids, peptides, proteins, (b) acids, esters and lipids, (c) carbohydrates, (d) vitamins.

513,127
PB85-854479/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Emulsifiers Used in the Meat Industry: Sausage Emulsions and Emulsifiers. 1972-January 1985 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for 1972-Jan 85.
Jan 85, 153p
Supersedes PB84-857846. Prepared in cooperation with International Food Information Service, Frankfurt am Main (Germany, F.R.).

This bibliography contains citations concerning sausage emulsions and emulsifiers. The emulsifiers used for processing sausage meat including milk, soybean, and other vegetable protein as well as blood protien fractions, are discussed. Methods for processing sausage meat are considered, including protein solubility and water binding. (This updated bibliography contains 212 citations, 27 of which are new entries to the previous edition.)

513,128
PB85-920400/GAR Subscription
Food and Drug Administration, Rockville, MD.
FDA (Food and Drug Administration) Compliance Program Guidance Manual and Updates. Sections 1-4.
Irregular repts.
1985, 1p
Supersedes PB84-920400.
Paper copy available on subscription, North American Continent price $320.00/year; all others write for quote. Updates also available in single copies. Basic manual available individually as PB85-920499.

This manual provides a system for issuing and filing written program plans and instructions which direct the work of FDA Field operations. The manual is broken into four program areas: foods and cosmetics, drugs and biologics, veterinary medicine, and medical and radiological devices. Compliance programs are written to accomplish the following objectives: (a) Provides uniform guidance and specific instructions for gathering and presenting evidence needed to support the various Agency regulatory operations when noncompliance is encountered in industry and/or products; (b) Gather product or industry information within a specified timeframe to determine the existence or extent of a problem; (c) Accumulate data on a known problem to determine the long range trends on a statistical basis.

513,129
PB85-920499/GAR PC **A99**
Food and Drug Administration, Rockville, MD.
FDA (Food and Drug Administration) Compliance Program Guidance Manual (FY 85). Sections 1-4.
1985, 2417p FDA/OMO-85/16
Supersedes PB84-920499. Manual includes four sections that are also available individually as PB85-920599, PB85-920699, PB85-920899, and PB85-920999. Updates and basic manual available on subscription as PB85-920400.

This manual provides a system for issuing and filing written program plans and instructions which direct the work of FDA Field operations. The manual is broken into four program areas: foods and cosmetics, drugs and biologics, veterinary medicine, and medical and radiological devices. Compliance programs are written to accomplish the following objectives: (a) Provides uniform guidance and specific instructions for gathering and presenting evidence needed to support the various Agency regulatory operations when noncompliance is encountered in industry and/or products; (b) Gather product or industry information within a specified timeframe to determine the existence or extent of a problem; (c) Accumulate data on a known problem to determine the long range trends on a statistical basis.

513,130
PB85-920500/GAR Subscription
Food and Drug Administration, Rockville, MD.
FDA (Food and Drug Administration) Compliance Program Guidance Manual and Updates (FY 85). Section 1. Foods and Cosmetics.
Irregular repts.
1985, 1p
Supersedes PB84-920500.
Paper copy available on subscription, North American Continent price $100.00/year; all others write for quote. Updates also available in single copies. Basic manual available individually as PB85-920599.

The FDA Compliance Program Guidance Manual provides a system for issuing and filing written program plans and instructions directed to Food and Drug Administration Field operations for project implementation. Section I provides those chapters of the Compliance Program Guidance Manual which pertain to the area of foods and cosmetics. Some of the areas of coverage include food sanitation, pesticide and chemical contaminants in foods, retail food protection, cosmetic program, and consumer education in foods and cosmetics.

513,131
PB85-920599/GAR PC **A24**
Food and Drug Administration, Rockville, MD.

FDA (Food and Drug Administration) Compliance Program Guidance Manual (FY 85). Section 1. Foods and Cosmetics.
1985, 569p FDA/OMO-85/16A
Supersedes PB84-920599. Updates and basic manual available on subscription as PB85-920500.

The FDA Compliance Program Guidance Manual provides a system for issuing and filing written program plans and instructions directed to Food and Drug Administration Field operations for project implementation. Section I provides those chapters of the Compliance Program Guidance Manual which pertain to the area of foods and cosmetics. Some of the areas of coverage include food sanitation, pesticide and chemical contaminants in foods, retail food protection, cosmetic program, and consumer education in foods and cosmetics.

6J. Industrial (Occupational) Medicine

513,132
DE85001571/GAR PC **A04/MF A01**
Lawrence Livermore National Lab., CA.
Task Analysis: A Detailed Example of Stepping Up from JSA.
W. W. Banks, B. A. Paramore, and J. R. Buys. Oct 84, 59p UCRL-91596, CONF-8410163-1
Contract W-7405-ENG-48
National safety congress, Chicago, IL, USA, 15 Oct 1984.
Portions are illegible in microfiche products.

This paper discusses a pilot task analysis of operations in a proposed facility for the cutting and packaging of radioactively contaminated gloveboxes, for long-term storage or burial. The objective was to demonstrate how task analysis may be used as a tool for planning and risk management. Two specific products were generated - preliminary operating procedures and training requirements. The task data base, procedures list and training requirements developed were intended as first order categorizations. The analysis was limited to tasks that will be performed within the boundaries of the operational facility and the associated load-out area. The analysis documents tasks to be performed by D and D (Decontamination and Decommissioning) Workers. However, the analysis included all tasks identified as an integral part of glovebox processing within the facility. Thus tasks involving Radiation Protection Technicians (RPTs) are included. Based on hazard assessments, it is planned that at least two RPTs will be assigned full-time to the facility, so they may be considered part of its crew. Similarly, supervisory/administrative tasks are included where they were determined to be directly part of process sequences, such as obtaining appropriate certification. 11 tables. (ERA citation 10:003523)

513,133
DE85002150/GAR PC **A02/MF A01**
Argonne National Lab., IL.
Current (1984) Status of the Study of sup 226 Ra and sup 228 Ra in Humans at the Center for Human Radiobiology.
J. Rundo, A. T. Keane, H. F. Lucas, R. A. Schlenker, and J. H. Stebbings. 1984, 17p CONF-8410147-2
Contract W-31-109-ENG-38
Radiobiology of radium and thorotrast conference, Neuherberg, F.R. Germany, 29 Oct 1984.

The Center for Human Radiobiology has identified 5784 persons by name and type of exposure to sup 226 Ra and sup 228 Ra. Included are 4863 dial painters (mostly women) and non-laboratory employees of the radium dial industry, 410 laboratory workers, 399 persons who received radium for supposed therapeutic effects, and 112 in other categories. Body contents of radium have been measured in 1916 of the dial workers and about one-half of the subjects in the other groups. Bone sarcomas, carcinomas of the paranasal sinuses and mastoids, and deterioration of skeletal tissue are still the only effects unequivocally attributable to internal radium. Excess leukemias have not been observed and other malignancies, if in excess, appear more likely to be related to external gamma radiation or radon than to internal radium. Positive correlations with radium burdens have been found for the incidence of benign exostoses among subjects exposed to radium before age 18 and for shortened latency of ocular cataracts. 26 references, 3 figures, 5 tables. (ERA citation 09:050608)

513,134
DE85002394/GAR PC **A02/MF A01**
Reynolds Electrical and Engineering Co., Inc., Las Vegas, NV.
Safety Assessment of the Area 6 Decontamination Pad and Laundry.
M. W. Chilton, and J. A. Orcutt. Oct 84, 17p DOE/NV/10327-12
Contract AC08-84NV10327
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The Safety Assessment of the Area 6 Decontamination Pad and Laundry, prepared in accordance with DOE Order 5481.1A, identifies and evaluates potential radiation and chemical hazards to personnel, and impacts on the environment. Site and facility characteristics, as well as routine and nonroutine operations are discussed. Hypothetical incidents and accidents are described and evaluated. 3 figures, 1 table. (ERA citation 10:003520)

513,135
HRP-0906073/2/GAR PC **A06/MF A01**
Arizona Center for Occupational Safety and Health, Tucson.
Occupational and Environmental Health Curriculum: A Handbook of Materials and Methods.
Project module,
K. M. Rest, J. C. Hake, and D. H. Cordes. Dec 83, 123p
Contract PHS-HRA-232-81-0047

The teaching materials provided in this booklet were produced as part of an occupational and environmental health curriculum development project for students and practitioners of family medicine and other primary care specialties. The materials provided include goals, objectives, case studies, group exercises, suggested readings, and faculty guides in five core areas: the screening occupational history, the in-depth, diagnostic occupational history, ethical issues in occupational health, how to follow up a hazard, and evaluation of impairment and disability.

513,136
HRP-0906075/7/GAR PC **A04/MF A01**
Arizona Center for Occupational Safety and Health, Tucson.
Community Air Pollution: Sources, Health Effects, and Physician Responsibility.
Project module,
D. Foster, and G. Kahn. Dec 82, 67p
Contract PHS-HRA-232-78-0191

This text is primarily concerned with identifying and classifying types of air pollution, identifying its sources, explaining the adverse health effects of each type, discussing patients particularly at risk from air pollution, and defining the role of the primary care physician in relation to air pollution problems.

513,137
HRP-0906076/5/GAR PC **A03/MF A01**
Arizona Center for Occupational Safety and Health, Tucson.
Copper Production: Processes and Attendant Hazards.
Project module,
S. Pike. Dec 82, 36p
Contract PHS-HRA-232-78-0190

Contents:
- Copper production;
- Copper in humans;
- Epidemiology;
- Morbidity;
- Accident survey;
- Mining and smelting process;
- Copper smelting;
- Hazards of copper smelting;
- Arsenic;
- Lead;
- Cadmium;
- Carbon monoxide;
- Copper;
- Silica;
- Air temperature and humidity;
- General instructions to examiner.

513,138
HRP-0906077/3/GAR PC **A04/MF A01**
Arizona Center for Occupational Safety and Health, Tucson.
Chemical Carcinogens.
Project module,
A. Silverstone. Dec 82, 64p
Contract PHS-HRA-232-78-0191
Prepared in cooperation with Memorial Sloan-Kettering Cancer Center, New York.

Contents:
- Chemical carcinogens--(Introduction, Chemical carcinogenesis:
- historical origins, The 'Chronic Irritation' theory, Metabolic activation, Types of carcinogenic action, The target of carcinogenic effects, The current status of human carcinogens, Sources of exposure and representative carcinogens, Short term tests and their significance, and Screening);
- References.

513,139
HRP-0906078/1/GAR PC **A04/MF A01**
Arizona Center for Occupational Safety and Health, Tucson.
Hazards to Agricultural Workers.
Project module,
S. Shapiro, and D. Foster. Dec 82, 56p
Contract PHS-HRA-232-78-0191

In the text that follows, the major hazards to residents of the farm community will be presented. Farm accidents, toxic chemicals, gaseous hazards, physical and environmental hazards, zoonoses, hypersensitivity pneumonitis, other respiratory hazards, and some aspects of the problems of migrant laborers will be discussed.

513,140
HRP-0906080/7/GAR PC **A03/MF A01**
Arizona Center for Occupational Safety and Health, Tucson.
Hazards to Hospital Workers: Prevalence, Practice, and Prevention.
Project module (Draft),
B. Warren. Dec 82, 40p
Contract PHS-HRA-232-78-0191

The hazards confronted by hospital workers are a particularly useful example of occupational health problems for health care providers to study. A cogent lesson in understanding the views of the worker is provided by studying the risks in one's own workplace. The materials presented in this module may serve as a foundation from which to analyze job-related risks to hospital workers. It will be then possible to better serve the patients, and support improved preventive occupational health programs in the hospital.

513,141
HRP-0906081/5/GAR PC **A03/MF A01**
Arizona Center for Occupational Safety and Health, Tucson.
Hazards of Radiation at Work and in the Environment.
Project module,
P. Decoufle. Dec 82, 39p
Contract PHS-HRA-232-78-0191

Partial contents: Radiation hazards--relevance, practice and prevention; Radiation quantities and units; Sources of radiation exposure; Biological effects of ionizing radiation; Radiation monitoring devices; and Principles of radiation protection.

513,142
HRP-0906082/3/GAR PC **A03/MF A01**
Arizona Center for Occupational Safety and Health, Tucson.
Occupational Stress: The Hidden Hazard.
Project module,
L. Peck. Dec 82, 41p
Contract PHS-HRA-232-78-0191

Contents: Rationale; Learning objectives; Occupational stress--the hidden hazard (Stress--definitions, elaboration and qualifications, Stressors, Moderating variables, Definition of risk groups, Experiences in stress management).

513,143
HRP-0906083/1/GAR PC **A03/MF A01**

Arizona Center for Occupational Safety and Health, Tucson.
Organic Solvents.
Project module,
F. Stagg. Dec 82, 41p
Contract PHS-HRA-232-78-0191

Contents:
- Solvents - definition and importance;
- Types of solvent exposure;
- Functional classification;
- Occupational exposure;
- Nonoccupational exposure;
- Routes and parameters of solvent exposure;
- Inhalation of solvents/threshold limit values;
- Behavioral toxicology and TLVs;
- Physical exertion and TLVs;
- TLVs and clinical medicine;
- Solvents in clinical medicine - a systemic approach;
- Clinical diagnosis and treatment.

513,144
HRP-0906084/9/GAR PC **A03**/MF **A01**
Arizona Center for Occupational Safety and Health, Tucson.
Occupational Respiratory Diseases.
Project module,
R. Dodge. Dec 82, 32p
Contract PHS-HRA-232-78-0191

Partial contents: Nonspecific determinants of disease; The deposition of particles in the respiratory tract; The mechanical and immunological defenses of exposed persons; Methods of assessing respiratory health; Classification of occupational respiratory diseases based on mechanisms of lung injury; Occupational lung disease; Other occupational lung diseases secondary to inorganic compounds; Diseases caused by fumes and gases; Diseases caused by inhalation of organic dusts; and Exposure to other organic materials.

513,145
HRP-0906085/6/GAR PC **A03**/MF **A01**
Arizona Center for Occupational Safety and Health, Tucson.
Occupational Dermatoses.
Project module,
A. Tedesco. Dec 82, 39p
Contract PHS-HRA-232-78-0191

A vast number of different physical, mechanical, chemical and biological aspects in the workplace are capable of inciting an inflammatory response in the skin which can contribute to unnecessary suffering and lost time from work. In fact, industrial dermatoses are the most common type of occupation-related disease. Contact dermatitis encompasses approximately 90% of all cases of occupational dermatoses; about 80% of those cases are related to the irritant effects of chemicals and 20% are related to allergic responses. A large part of this paper is devoted to contact dermatitis.

513,146
HRP-0906086/4/GAR PC **A03**/MF **A01**
Arizona Center for Occupational Safety and Health, Tucson.
Reproductive Hazards in the Workplace.
Project module,
D. H. Cordes. Dec 82, 26p
Contract PHS-HRA-232-78-0191

Partial contents: Prevention/control of reproductive hazards for female workers; Prevention/control of male reproductive hazards; Questions for occupational history (female); Recommendation development process (female); Chart of toxins and effects (female); Male reproductive history; and Selected agents toxic to the male reproductive system which may be of occupational significance.

513,147
HRP-0906089/8/GAR PC **A03**/MF **A01**
Arizona Center for Occupational Safety and Health, Tucson.
Community Diagnosis: The Industrial and Environmental Profile.
Project module,
T. M. Mettee. Sep 82, 43p
Contract PHS-HRA-232-81-0047

The industrial and environmental profile: Case example - Cleveland's near westside--(Subjective data, Objective data-physical examination and laboratory and ancillary data); Developing an industrial and environmental profile; The industrial profile--(The state industrial directory, Standard industrial classification, High health hazard industry, Common hazardous agents or materials, and Industrial survey data sheet); The environmental profile--(Air pollution profiling, The pollution standard index, and Total suspended particulates-nitrogen dioxide, sulfur dioxide, and air pollution complaints); and Community diagnosis in perspective.

513,148
HRP-0906090/6/GAR PC **A02**/MF **A01**
Arizona Center for Occupational Safety and Health, Tucson.
Office Screening of Occupational Illness.
Project module,
R. Y. Demers, and L. Rosenstock. Sep 82, 24p
Contract PHS-HRA-232-81-0047

Partial contents: Distinctive features of screening of occupational disease; Challenge to the practicing physician; Office based screening for occupational diseases; and Occupational disease schedule related to test validity and occupational exposures.

513,149
HRP-0906091/4/GAR PC **A03**/MF **A01**
Arizona Center for Occupational Safety and Health, Tucson.
Occupational and Environmental History.
Project module,
K. M. Rest, J. C. Hake, and D. H. Cordes. May 83, 41p
Contract PHS-HRA-232-81-0047

Essential Elements of the Occupational and Environmental History--Whether used for screening or for diagnosis, the occupational and environmental history is essentially made up of three important elements: Present Job, Past Work, and Other Nonoccupational Exposures. Data relating to these three areas of the patient's work, home, and community environments can be collected by expanding the social history to include the occupational and environmental history and by integrating questions relating to work and the environment into the general medical work-up - the History of Present Illness (HPI), Review of Systems (ROS), and Past Medical History (PMH). The reasons for collecting data on a patient's present job are obvious. These data tell the physician what the patient does on the job and what his/her present exposures are. Many of these current exposures can influence the occurence of both acute and chronic health problems in individual patients. Most of these can be prevented. Avenues of prevention are discussed later in this text. Family and primary care physicians can impact the incidence and prevalence of occupational illness and injury by focusing attention on their patients' present jobs.

513,150
HRP-0906092/2/GAR PC **A03**/MF **A01**
Arizona Center for Occupational Safety and Health, Tucson.
Ethical Dilemmas Facing Clinicians Who Provide Health Services to Workers.
Project module,
L. Rosenstock. Sep 82, 33p
Contract PHS-HRA-232-81-0047

There has been increasing attention to ethical issues in general in the provision of medical care. In addition, the ethical dilemnas faced by physicians who provide occupational health services have come under particularly close scrutiny. Some of the problems of delivering occupational health care can be traced in part to the historical background of the development of occupational health services. Workers have come to mistrust not only the company physician, but to be wary of the role any physician may take in providing care for work-related health problems. Several aspects of providing health care to workers pose unique ethical problems for physicians. These include the issues of: (1) loyalty; to whom does the physician respond and to whom is he/she most accountable; (2) confidentiality; who should have access to what medical records and information; and (3) reporting; to whom should suspected or known hazards or illnesses be reported. In addition, physicians are asked to play a central role in decisions about employability through participation in preemployment and periodic exams. This activity, among others, raises questions of legal, medical, and ethical concern.

513,151
HRP-0906094/8/GAR PC **A04**/MF **A01**
Arizona Center for Occupational Safety and Health, Tucson.
Physical Hazards 1: Heat and Cold.
Project module,
T. J. Flood, and J. C. Hake. Sep 83, 60p
Contract PHS-HRA-232-81-0047

Partial contents: The incidence of heat-related illness; Occupational groups at risk for heat injury; Physiology of thermoregulation; Heat stress indices; Pathophysiology and clinical features of heat stress illness; Diagnosis and management of heat stress illness; and Prevention and control.

513,152
HRP-0906095/5/GAR PC **A03**/MF **A01**
Arizona Center for Occupational Safety and Health, Tucson.
Alcoholism and Work.
Project module,
J. Solomon. Dec 82, 33p
Contract PHS-HRA-232-81-0047

Alcoholism affects large numbers of people throughout all geographic, cultural, and social strata. Once the diagnosis of alcoholism is made, it is a treatable condition. Left untreated, however, it usually follows a progressive, deteriorating course with a wide spectrum of physical, psychological and social consequences. Recently, there has been much attention paid to the role of alcoholism in the workplace in terms of both cost to business and industry as well as early case finding and rehabilitation. Primary care physicians often play an integral role in these programs and are frequently called upon to assist in their development.

513,153
PB85-139210/GAR PC **A09**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Preventive Medicine.
Potential Office Hazards and Controls,
R. Arndt, and L. Chapman. Sep 84, 187p
See also PB83-182436. Sponsored in part by Office of Technology Assessment, Washington, DC.

The paper was written for OTA to assist in preparation of the report Preventing Illness and Injury in the Workplace. It discusses office worker exposure to indoor air pollution in tightly insulated buildings; potentially harmful psychological stress from poorly designed jobs and potentially harmful physical stress from poorly designed machines and work station. Various controls for these hazards are considered and evaluated.

513,154
PB85-854594/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Protective Clothing: Industrial Environments. 1970-1984 (Citations from the NTIS Data Base).
Rept. for 1970-1984.
Jan 85, 255p
Supersedes PB83-804922.

This bibliography contains citations concerning protective clothing for industrial atmospheres and work stations. The studies include the design, testing, and evaluation of boots, gloves, respirators, helmets, goggles, hearing protectors, and outer garments. Included under the broad term of industrial atmospheres are chemical, manufacturing, metal working, mining, and construction industries, as well as security personnel and police. (This updated bibliography contains 322 citations, 52 of which are new entries to the previous edition.)

6L. Medical and Hospital Equipment

513,155
DE85900140/GAR PC **A03**/MF **A01**
Institute of Nuclear Energy Research, Lung-Tan (Taiwan).
Low Cost Multichannel Pulse Waveform Recorder.
H. H. Chang, C. F. Yu, and J. S. Tang. May 82, 26p
INER-0510
U.S. Sales Only.

This paper describes a low cost multichannel pulse waveform recorder using AIM-65 microcomputer as its controller. The pulse waveform up to six channels are taken from the patient's radial arteries, then sequencially amplified and digitized by the control of AIM-65 microcomputer which stores the pulse waveform samples in 4Kx8-bit RAM and passes the stored data to a printer or to a cassette recorder. The recorded pulse waveforms are used for analysis and diagnosis in orthodox Chinese medicine. 3 references, 7 figures. (ERA citation 10:001239)

513,156
HRP-0006072/4/GAR PC **A04/MF A01**
Health Planning Council, Inc., Providence, RI.
Recommendations for Assessment, Introduction, Use, and Evaluation of Advanced Medical Technologies and Therapeutic Interventions in Rhode Island.
Jun 84, 66p

The purpose of this study was to make recommendations to the Rhode Island Department of Health regarding assessment of the state of the art, introduction, use, and evaluation of advanced medical technologies and advanced therapeutic interventions in the state. Such recommendations were to include generic criteria applicable to any advanced technology or intervention. Those criteria were to be applied to two specific advances: nuclear magnetic resonance (NMR) and organ transplantation.

513,157
PB85-854164/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Biocompatibility of Polymeric Implantation Devices. June 1983-January 1985 (Citations from the Rubber and Plastics Research Association Data Base).
Rept. for Jun 83-Jan 85.
Jan 85, 67p
Supersedes PB84-863588.

This bibliography contains citations concerning toxicological evaluation of elastomeric and plastic biomaterials utilized for implantation devices in humans and animals. Degradation from living body enzyme exposure of such synthetic implantation materials as polyethylene, polycarbonate, polyglycolide, polypropylene, polycaproamide, PTFE, silicone rubber, epoxy resin, natural rubber latex, and polyurethane is discussed. Among the applications examined are lung tissue, pacemaker electrical leads, fibrin-based material for bone repair, ophthalmological needs, blood pumps, blood vessels, contraceptives, kidneys, electronic device encapsulation, and dental needs. Polymeric prosthetic devices are included in another bibliography. (This updated bibliography contains 71 citations, 14 of which are new entries to the previous edition.)

513,158
PB85-854339/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Prosthetic devices. June 1972-January 1985 (Citations from the NTIS Data Base).
Rept. for Jun 72-Jan 85.
Jan 85, 263p
Supersedes PB84-857853.

This bibliography contains citations concerning prosthetic device design, materials, and efficacy. The operation and biological compatibility of these devices are considered, and environmental effects, including electric fields, on the prostheses are discussed. Devices, including implants, artificial organs, limbs, and bone replacements are considered. (This updated bibliography contains 332 citations, 12 of which are new entries to the previous edition.)

513,159
PB85-854693/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Polymeric Prosthetic Devices and Materials. 1970-January 1985 (Citations from the U. S. Patent Data Base).
Rept. for 1970-Jan 85.
Jan 85, 124p

This bibliography contains citations of selected patents concerning design aspects and production methods pertaining to polymeric prosthetic devices which are implanted into the human body. Fabrication techniques, specific material compositions, and surface treatment methods used to enhance biocompatibility are presented. Dental and bone prosthetics, and artificial organs and limbs are among the devices described. (Contains 156 citations fully indexed and including a title list.)

513,160
PB85-920900/GAR Subscription
Food and Drug Administration, Rockville, MD.
FDA (Food and Drug Administration) Compliance Program Guidance Manual and Updates (FY 85). Section 4. Medical and Radiological Devices.
Irregular repts.
1985, 1p
Supersedes PB84-920900.
Paper copy available on subscription, North American Continent price $125.00/year; all others write for quote. Updates also available in single copies. Basic manual available individually as PB85-920999.

The FDA Compliance Program Guidance Manual provides a system for issuing and filing program plans and instructions directed to Food and Drug Administration Field operations for project implementation. Section IV provides those chapters of the Compliance Program Guidance Manual which pertain to the areas of medical and radiological devices. Some of the areas of coverage include laser and sunlamp standards inspections, compliance testing of various radiation-emitting products such as television receivers and microwave ovens, emergency response planning and policy, premarket approval and device manufacturers inspections, device problem reporting, sterilization of devices, and consumer education programs on medical and radiological devices.

513,161
PB85-920999/GAR PC **A99**
Food and Drug Administration, Rockville, MD.
FDA (Food and Drug Administration) Compliance Program Guidance Manual (FY 85). Section 4. Medical and Radiological Devices.
1985, 790p FDA/OMO-85/16D
Supersedes PB84-920999. Updates and basic manual available on subscription as PB85-920900.

The FDA Compliance Program Guidance Manual provides a system for issuing and filing program plans and instructions directed to Food and Drug Administration Field operations for project implementation. Section IV provides those chapters of the Compliance Program Guidance Manual which pertain to the areas of medical and radiological devices. Some of the areas of coverage include laser and sunlamp standards inspections, compliance testing of various radiation-emitting products such as television receivers and microwave ovens, emergency response planning and policy, premarket approval and device manufacturers inspections, device problem reporting, sterilization of devices, and consumer education programs on medical and radiological devices.

6M. Microbiology:

513,162
AD-A148 760/2/GAR PC **A02/MF A01**
Helsinki Univ. (Finland).
Propagation and Characterization of the Etiologic Agent of Nephropathia Epidemica.
Final rept. 1 Apr-30 Sep 82,
C. H. von Bonsdorff. Jun 83, 20p
Grant DAMD17-82-G-9508

Nephropathia epidemica (NE) virus, strain Puumala, was passaged successfully in C. gaperi voles. In addition to lung suapensions, urine of the infected voles was also shown to be infectious. Attempts to adapt the virus to cell cultures remained unsuccessful.

513,163
PB85-138170/GAR PC **A03/MF A01**
Southwest Research Inst., San Antonio, TX.
Distribution of Bacterial Infections in the Lubbock Infection Surveillance Study of Wastewater Spray Irrigation,
D. E. Camann, and M. N. Guentzel. Dec 84, 30p
EPA/600/D-84/288
Prepared in cooperation with Texas Univ. at San Antonio.

The Lubbock Infection Surveillance Study monitored bacterial infections in the vicinity of the Lubbock Land Treatment System expansion near Wilson, Texas to investigate the association, if any, between the occurrence of new bacterial infection in people and their exposure through slow rate (sprinkler) land application to wastewater or its aerosol which contained potentially pathogenic bacteria. Bacterial infections were monitored during the first four major periods of wastewater irrigation: February-April 1982, July-September 1982, February-April 1983 and July-August 1983. Fecal specimens were provided by about 120 donors in 1982 and 100 donors in 1983 during designated weeks just before, during and near the end of each irrigation period to detect new bacterial infections occurring in the interim. Clinical bacteriological analyses were designed to isolate overt and opportunistic pathogens.

513,164
PB85-146785/GAR PC **A02/MF A01**
Health Effects Research Lab., Cincinnati, OH.
Coliphages as Indicators of Enteroviruses.
Journal article May 81-May 82,
R. E. Stetler. 1984, 5p EPA/600/J-84/163
Pub. in Jnl. of Applied and Environmental Microbiology, v48 n3 p668-670 Sep 84.

Coliphages were monitored in conjunction with indicator bacteria and enteric viruses in a drinking water plant modified to reduce trihalomethane (THM) production. Coliphages could be detected in the source water by direct innoculation and sufficient coliphages were detected in enteric virus concentrates to permit following coliphage levels through different water treatment processes. Recovery efficiency by different filter types ranged from 1% to 53%. Coliphages, detected on E. coli A-19, and enteric viruses were removed at similar rates by the different treatment processes. Coliphages were not detected in finished water.

6O. Pharmacology

513,165
AD-A148 585/3/GAR PC **A02/MF A01**
Walter Reed Army Inst. of Research, Washington, DC.
Effect of LiCl on Gastric Acid Secretion and Mucosal Barrier Function,
K. D. Lillemoe, J. W. Harmon, R. K. H. Wong, H. B. Boedeker, and L. F. Johnson. 1983, 9p
Pub. in Jnl. of Surgical Research, v35 p50-56 1983.

No abstract available.

513,166
AD-A148 648/9/GAR PC **A03/MF A01**
Illinois Univ. at the Medical Center, Chicago. Dept. of Medicinal Chemistry.
Synthesis of New Prophylactic Antiradiation Drugs.
Annual rept. 1 Aug 81-31 Jul 82,
L. Bauer, and I. Handa. Aug 82, 38p
Contract DAMD17-79-C-9146

S series of N-(3-aryl-1-adamantanemethyl)-alpha-mercaptoacetamidines and derivatives was synthesized. A number of 3-aryl-1-adamantanemethylamines B were synthesized first. These amines would become part of the N-substituent of the amidine function, R'NH-C(=NH)-CH2SY. The specific alpha-mercaptoacetamidines and derivatives, which were prepared, were those in which R=CH3, and SY is S2O3(-) (Bunte Salt), SPO3(-2) and S-S(disulfide); R=OCH3, and SY is SH,S-S(disulfide), SPO3(-2); R=F, and SY is SH, S-S(disulfide), SPO3(-2); as well as R=SCH3, where SY is S2O3(-) (Bunte Salt), or SPO3(-2). Of the 10 compounds sent to Walter Reed Army Institute for Research, 6 were evaluated for radiation protective potency in mice. The compounds showed some protective activity but did not show unusual promise, in part due to their relatively high toxicity.

513,167
AD-A148 649/7/GAR PC **A03/MF A01**
Illinois Univ. at the Medical Center, Chicago. Dept. of Medicinal Chemistry.

Synthesis of New Prophylactic Antiradiation Drugs.
Annual rept. 1 Aug 82-31 Jul 83,
L. Bauer. Aug 83, 46p
Contract DAMD17-79-C-9146

This report is divided into four (4) major sections. Each section addresses a phase of the syntheses of adamantyl aryl alkylamines where the amine is incorported into an N-substituted 2-mercaptoacetamidine, or a derivative of the sulfide function. The first part describes the efforts in the 1-aryl-3-adamantyl-methylamine series where the aryl group is 2-thienyl. The next section is devoted to the practical approaches to the synthesis of 1-aryl-2-adamantylalkyl-amines. The work culminates in the preparation of the first member, namely, 1-phenyl-2-adamantylmethylamine. The third section describes some preliminary work on the preparation of 1-aryl-4-adamantylalkylamines. And, the last section reports the synthesis of 4-(1-adamantyl)benzylamines and its conversion to the disulfide based on N-(4-(1-adamantyl)benzyl)-2-mercaptoacetamidine.

513,168
AD-A148 650/5/GAR PC **A02/MF A01**
Yale Univ., New Haven, CT. School of Medicine.
Use of ATP-MgCl2 in the Treatment of Injury and Shock.
Annual rept. 1 Sep 81-31 Aug 82,
A. E. Baue, and I. H. Chaudry. 31 Aug 82, 16p
Contract DAMD17-81-C-1170

In normal as well as hypovolemic awake dogs, cardiac output can be increased significantly by infusion of ATP-MgCl2 intravenously at rates of 0.5-2.5mg/kg/min. The higher doses of ATP-MgCl2 may have detrimental hemodynamic effects, however, such effects are immediately reversible by ceasing ATP-MgCl2 infusion. Moreover, the deleterious hemodynamic effects of very high doses of ATP-MgCl2 can be markedly ameliorated by atropine. Infusion of ATP-MgCl2 did not affect hepatic or renal function, myocardium or blood chemistry after infusion or even after a prolonged period of time. Infusion of even massive doses of ATP-MgCl2 have no ill effects on the survival of dogs.

513,169
AD-A148 651/3/GAR PC **A02/MF A01**
Yale Univ., New Haven, CT. Dept. of Surgery.
Use of ATP-MgCl2 in the Treatment of Injury and Shock.
Annual rept. 1 Sep 82-31 Aug 83,
A. E. Baue, and I. H. Chaudry. 31 Aug 83, 12p
Contract DAMD17-81-C-1170

In conscious rate and primates, bolus infusion of the entire efficacious dose of ATP-MgCl2 transiently decrease mean blood pressure but there were no long term side effects and there were no mortalities. Moreover, daily administration of the entire efficacious dose of ATP-MgCl2 for a period of three months in rats did not produce any mortality or adverse side effects. ATP-MgCl2 was approved for clinical studies by the Food and Drug Administration of the U.S. Army's and our Human Investigation Committee.

513,170
AD-A148 683/6/GAR PC **A02/MF A01**
International Narcotic Research Conference.
International Narcotic Research Conference (14th) Held at Garmisch-Partenkirchen, West Germany on 27 June-1 July 1983.
Final rept. 1 Jun 83-31 May 84,
A. Herz. Jun 84, 9p
Grant DAMD17-83-G-9542

A broad range of research activities were spanned in this annual meeting of the International Narcotic Research Conference. These included an emphasis on biochemical and pharmacological studies, as well as reports dealing with the physiological or pathophysiological functions of endogenous oipoid systems. The relevance of these areas of basic science to the clinical domain was also emphasized in a few reports. The interdisciplinary nature of these meetings again resulted in a synthesis of new approaches to biomedical research in the area of endogenous opioid systems.

513,171
AD-A148 734/7/GAR PC **A10/MF A01**
Bio-Med, Inc., College Park, MD.
Army Drug Development Program. Phase 1. Clinical Testing.
Annual rept. Jan 82-Jan 83,
J. A. Johnson, and R. C. Reba. Feb 83, 225p
Contract DAMD17-75-C-5036

In a double-blind study of safety and tolerance, 44 healthy male subjects were each given from 1000 to 2500 mg of the drug WR 194,965/H3P04, or placebo, in 3 doses over a period of 24 hours. Symptomatology, physical status, laboratory tests, phototoxicity and electrocardiographic rhythm strips were used to study the safety and tolerance of the drug. At the highest dose level, one subject who received the drug had moderately debilitating gastrointestinal symptoms; the other had marked light-headedness. Mild, non-debilitating symptoms were noted in drug recipients at the lower dose level. Placebo subjects had the expected array of non-specific complaints. The other variables observed showed no consistent differences between drug and placebo subjects. The drug was well-tolerated at 2000 mg with no reported symptoms; it appeared to produce mild symptoms at 2250 mg and significant symptoms at 2500 mg.

513,172
AD-A148 763/6/GAR PC **A05/MF A01**
Bio-Med, Inc., College Park, MD.
Army Drug Development Program. Phase 1. Clinical Testing.
Annual rept. Feb 81-Feb 82,
R. Reba. Feb 82, 85p
Contract DAMD17-75-C-5036

In a double-blind study of safety and tolerance, 32 healthy male subjects were each given from 750 to 1500 mg of the drug WR 180,409 H3PO4, or placebo, in 3 doses over a period of 24 hours. Blood specimens were collected at the designated times and sent to the Department of Pharmacology, Walter Reed Army Institute of Research, for determination of the pharmacokinetics of WR 180,409 H3 PO4 in multiple doses. Although mild gastrointestinal symptons or lightheadedness were observed in one of every four subjects receiving the drug, there was no apparent dose/response relationship and equivalent symptons were also encountered in subjects receiving placebo. No clear-cut signs of intolerance were noted at any dose level administered.

513,173
AD-A148 820/4/GAR PC **A05/MF A01**
Bio-Med, Inc., College Park, MD.
Army Drug Development Program. Phase 1. Clinical Testing.
Annual rept. 1 Feb-18 Aug 83, Final rept. 15 Feb 75-18 Aug 83,
R. C.Reba, K. G. Barry, and L. B. Altstatt. Oct 83, 86p
Contract DAMD17--75-C-5036

In the period from 15 February 1975 to 18 August 1983 Bio-Med, Inc. was involved in the following activities; (1) Consultation with the Division of Experimental Therapeutics at the Walter Reed Army Institute of Research (WRAIR) regarding drugs under development. (2) The development of protocols for Phase I Clinical Studies and the administrative and technical processing of these protocols including (a) appropriate scientific consultation regarding medical aspects of the studies, (b) institutional review including review of the protocol by a duly constituted Institutional Review Board, and (c) submission of the protocol(s) to the sponsoring agency for their internal review mechanisms. (3) The implementation of protocols which included subject recruitment, identification and medical qualification; the provision for the clinical environment for the conduct of the study including the nursing, dietetic, laboratory and custodial services; the conduct of the study including immediate medical supervision of drug administration, subject evaluation and specimen collection; the timely analysis of prescribed procedures such as EOGs, roentegenograms, etc.; and the medical follow-up of each subject and his eventual separation from the study.

513,174
DE85000006/GAR PC **A03/MF A01**
George Washington Univ., Washington, DC.
Development of gamma Emitting Receptor-Binding Radiotracers for Imaging the Brain and Pancreas. Progress Report, February 1983-September 1984.
R. C. Reba. 1984, 47p DOE/ER/60039-T1
Contract AS05-82ER60039
Portions are illegible in microfiche products.

The possibility of measuring the change in receptor concentration as a function of disease by external imaging was investigated. The structure-binding-relationship which provides optimal localization of radiolabelled antagonist of the muscarinic acetylcholine receptors in the brain was studied. These relationships were also studied with respect to localization in the pancreas. (ERA citation 10:003387)

513,175
PB85-137958/GAR PC **A02/MF A01**
American Public Health Association, Washington, DC. International Health Programs.
Analysis of the Pharmaceutical Logistics System in Honduras,
A. A. Leroy. 7 Sep 82, 19p AID-PN-AAL-726
Contract AID/DSPE-C-0053

Even though a large proportion of the health care budget in Honduras is allocated for pharmaceuticals, the majority of the population lack access to essential drugs. Based on a review of the Honduran Ministry of Health's pharmaceutical logistics systems, the authors of this report conclude health funds are often spent on drugs that are ineffective, of poor quality, or illsuited to the people's needs. Estimates of drug needs and procurement are arbitrary, warehousing and distribution are inadequate, and health personnel are basically untrained to handle and use drugs.

513,176
PB85-138485/GAR PC **A03/MF A01**
Stanford Univ., CA.
Development, Implementation, and Preliminary Evaluation of the Monitoring and Intervention of Therapeutic Actions System (MINERVA) - Executive Summary.
Rept. for 1 Sep 78-31 Aug 81,
S. N. Cohen, J. J. L. Kondo, R. J. Mangini, T. N. Moore, and A. B. Flood. 15 Jun 84, 37p NCHSR-84/237
Grant PHS-HS-03000
See also PB85-138493.

Monitoring and intervention of therapeutic actions (MINERVA) is a rule-oriented, computer-based system designed to monitor drug therapy, detect instances of inappropriate or suboptimal therapy, and generate medical advisories when such instances are found. The system utilizes a series of rules that incorporate the medical and pharmacological knowledge of experts, and that employ patient-related data obtained on-line from the hospital pharmacy and clinical laboratories, to assist in medical decision-making. Also included in the MINERVA system is a module that provides advisories when a newly prescribed medication is pharmacologically and/or chemically related to one that has produced a prior adverse reaction (PAR) in that patient. The report of the MINERVA project staff describes the development, implementation, and preliminary evaluation of the MINERVA system and its PAR component. The results of this project, and of its predecessor MEDIPHOR system project, show the general utility of computer-based systems for monitoring drug therapy and influencing physician behavior. The results support the view that further work using the general approach employed for the MEDIPHOR and MINERVA systems is likely to yield more effective methods of improving the quality of therapy.

513,177
PB85-138493/GAR PC **A14/MF A01**
Stanford Univ., CA.
Development, Implementation, and Preliminary Evaluation of the Monitoring and Intervention of Therapeutic Actions System (MINERVA) - Final Report.
Rept. for 1 Sep 78-31 Aug 81,
S. N. Cohen, J. J. L. Kondo, R. J. Mangini, T. N. Moore, and A. B. Flood. 15 Jun 84, 313p NCHSR-84/238
Grant PHS-HS-03000
See also PB85-138485.

Monitoring and intervention of therapeutic actions (MINERVA) is a rule-oriented, computer-based system designed to monitor drug therapy, detect instances of inappropriate or suboptimal therapy, and generate medical advisories when such instances are found. The system utilizes a series of rules that incorporate the medical and pharmacological knowledge of experts, and that employ patient-related data obtained on-line from the hospital pharmacy and clinical laboratories, to assist in medical decision-making. Also in-

cluded in the MINERVA system is a module that provides advisories when a newly prescribed medication is pharmacologically and/or chemically related to one that has produced a prior adverse reaction (PAR) in that patient. The report of the MINERVA project staff describes the development, implementation, and preliminary evaluation of the MINERVA system and its PAR component. The results support the view that further work using the general approach employed for the MEDIPHOR and MINERVA systems is likely to yield more effective methods of improving the quality of therapy.

513,178
PB85-920600/GAR Subscription
Food and Drug Administration, Rockville, MD.
FDA (Food and Drug Administration) Compliance Program Guidance Manual and Updates (FY 85). Section 2. Drugs and Biologics.
Irregular repts.
1985, 1p
Supersedes PB84-920600.
Paper copy available on subscription, North American Continent price $110.00/year; all others write for quote. Updates also available in single copies. Basic manual available individually as PB85-920699.

The FDA Compliance Program Guidance Manual provides a system for issuing and filing written program plans and instructions directed to Food and Drug Administration Field operations for project implementation. Section II provides those chapters of the Compliance Program Guidance Manual which pertain to the areas of human drugs and biological products. Some of the areas of coverage include New Drug Application (NDA) pre-approval inspections; good laboratory practices and clinical investigations; drug certification and manufacturing; blood banks and source plasma establishments inspections; and consumer education programs on human drugs and biological products.

513,179
PB85-920699/GAR PC **A99**
Food and Drug Administration, Rockville, MD.
FDA (Food and Drug Administration) Compliance Program Guidance Manual (FY85). Section 2. Drugs and Biologics.
1985, 891p FDA/OMO-85/16B
Supersedes PB84-920699. Updates and basic manual available on subscription as PB85-920600.Portions of this document are not fully legible.

The FDA Compliance Program Guidance Manual provides a system for issuing and filing written program plans and instructions directed to Food and Drug Administration Field operations for project implementation.

6P. Physiology

513,180
AD-A148 646/3/GAR PC **A02/MF A01**
Duke Univ. Medical Center, Durham, NC. Dept. of Ophthalmology.
Evoked Cortical Responses to Electrical Stimulation of the Ischemic Retina.
Final rept. Jul 82-Jul 83,
M. L. Wolbarsht. 5 Oct 84, 23p NADC-84139-60
Contract N62269-82-M-3306

The objective of this program has been the early detection of the disturbances in retinal blood flow, such as ischemia, that are the precursors of blackout and unconsciousness. External electrical stimulation of the peripheral retina has been used to evoke cortical responses while still allowing normal visual function. The purpose of the present work has been to test techniques that might furnish early warning of loss of brain function or blackout resulting from high positive G forces that produce circulatory stasis in the head, particularly in the brain or eye. During the present period the electrical evoked central response (EER) technique was used at the limits of its detection capabilities and compared with similar techniques using visual stimulation. Investigations on cats were carried out to determine if a decrease in peripheral blood flow could be equated with loss of responsiveness to electrical stimulation to peripheral portions of the retina from external electrodes. Loss of function in the retina due to ischemia has been successfully monitored by using electrical stimulation of the eye to evoke cortical responses. The earliest detection of loss of function due to decreased (or cessation of) blood flow in the retina yet achieved has used the average of 4-16 responses to electrical stimulation of the eye using external electrodes. Attempts to detect single responses have not yet been successful. The details of a matched delay analogue filter designed to optimize detection of a single cortical response are given. Responses to stimulation by paired electrodes at the inner and outer canthus and the brow and cheek are compared with each other and with an electrical stimulus delivered through a corneal contact lens.

513,181
DE85001226/GAR PC **A02/MF A01**
Yale Univ., New Haven, CT. School of Medicine.
Simultaneous Determination of Cerebral Blood Flow and Partition Coefficient with a Freely Diffusable Tracer.
A. Rescigno, R. M. Lambrecht, C. C. Duncan, C. Y. Shiue, and L. R. Ment. 1984, 9p BNL-35349, CONF-8409164-1
Contract AC02-76CH00016
NATO advanced study institute on physics and engineering of medical imaging, Marates, Italy, 24 Sep 1984.

A method is described, whereby cerebral blood flow (CBF) and partition coefficient are determined using the tracer exp 18 F-4-1 fluoroantipyrine and positron emission tomography (PET). 7 references. (ERA citation 10:003445)

513,182
DE85002576/GAR PC **A02/MF A01**
Oak Ridge National Lab., TN.
Metabolism of Organically Bound Tritium.
C. C. Travis. 1984, 22p CONF-8410171-1
Contract AC05-84OR21400
US/Japan workshop on tritium radiobiology and health physics, Tokyo, Japan, 29 Oct 1984.
Portions are illegible in microfiche products.

The classic methodology for estimating dose to man from environmental tritium ignores the fact that organically bound tritium in foodstuffs may be directly assimilated in the bound compartment of tissues without previous oxidation. We propose a four-compartment model consisting of a free body water compartment, two organic compartments, and a small, rapidly metabolizing compartment. The utility of this model lies in the ability to input organically bound tritium in foodstuffs directly into the organic compartments of the model. We found that organically bound tritium in foodstuffs can increase cumulative total body dose by a factor of 1.7 to 4.5 times the free body water dose alone, depending on the bound-to-loose ratio of tritium in the diet. Model predictions are compared with empirical measurements of tritium in human urine and tissue samples, and appear to be in close agreement. 10 references, 4 figures, 3 tables. (ERA citation 10:003424)

513,183
PB85-136919/GAR PC **E03/MF E03**
Institut Franco-Allemand de Recherches, Saint-Louis (France).
Mecanismes Cochleaires Impliques dans le Seuil de Sensibilite Auditive et le Seuil de Fatigue Auditive (Cochlear Mechanisms Implied in the Hearing Sensitivity Threshold and the Threshold of Auditory Fatigue).
A. Dancer, and P. Campo. 10 May 84, 13p CO-205/84
Text in French.

As had been the case for the thresholds of hearing sensitivity, the parameter speed of moving the cochlear septum seems a determining factor in the genesis of hearing fatigue. This parameter alone cannot explain the totality of the phenomena observed. Metabolic factors connected with the stimulation schema certainly play an important role, which is underlined by the observation of a vesicularization at the level of the nervous pole of the internal fringed cells in the case of purely auditory fatigue.

6Q. Protective Equipment

513,184
AD-A148 674/5/GAR PC **A03/MF A01**
Army Aeromedical Research Lab., Fort Rucker, AL.
SPH-4 U.S. Army Flight Helmet Performance 1972-1983,
T. E. Reading, J. L. Haley, A. C. Sippo, J. R. Licina, and A. W. Schopper. Nov 84, 49p Rept no. USAARL-85-1

Injury data was obtained from the US Army Safety Center for the occupants of US Army aircraft who were both wearing aviator helmets and involved in duty-related aircraft accidents from the period beginning on 1 January 1972 and ending on 31 December 1982. The injury data was correlated with the physical condition of the helmets involved which has been obtained by the US Army Aeromedical Research Laboratory under the Aviation Life Support Equipment Retrieval Program. The helmet performance was evaluated with regard to current injury prevention capabilities and potential improvements for future helmet designs. For consistency, only the 208 SPH-4s in the data base were fully analyzed. An appendix contains a limited analysis of the APH-5s performance. It should be emphasized that no combat damaged helmets are discussed or analyzed in this report: i.e., no shrapnel or bullet damage is covered. Originator-supplied keywords include: Head injury, Aviator helmet, Crushable earcups, Chinstrap, Aircraft accident, Facial injury, Energy attenuation, Helmet visor, Foam compression and Protective visor.

513,185
AD-A148 693/5/GAR PC **A03/MF A01**
Army Aeromedical Research Lab., Fort Rucker, AL.
Effect of Modified Spectacles on the Field of View of the Helmet Display Unit of the Integrated Helmet and Display Sighting System,
W. E. McLean, and C. E. RAsh. Sep 84, 34p Rept no. USAARL-84-12

A study was conducted to establish the effect of wearing modified aviator spectacles, either for laser protection or refractive error correction, on the field-of-view available with the Helmet Display Unit (HDU) of the Integrated Helmet and Display Sighting System (IHADSS). The determining factors of the available field were found to be helmet fit, eye fixation direction, and eye relief distance. The study concluded that when these factors are optimized, the wearing of the modified spectacles does not result in a loss of field-of-view.

513,186
AD-A148 805/5/GAR PC **A09/MF A01**
Army Natick Research and Development Center, MA.
Systems Analysis of Alternative Concepts for Aircrew Cold Weather Clothing.
Final rept.,
J. M. Walker. Mar 83, 181p Rept no. NATICK/TR-84/045

This analysis was performed in support of a requirement to develop a new clothing system for Army aircrews operating in regions where minimum winter temperatures are between 0 F (-17.8 C) and -60 F (-51.1 C). Each of five proposed clothing system concepts was evaluated to determine its feasibility and its effectiveness in satisfying the essential requirements specified in the Letter of Agreement. Two analytical models which simulate body cooling for various metabolic and environmental assumptions were used to determine the clothing insulation (clo) values required to provide thermal protection. Since the results indicated that auxiliary heated clothing items especially for the hands and feet will be necessary, an evaluation of potential power sources is included in the study. The report recommends that either two ensembles or a basic and an augmented version of the same ensemble be designed. The basic system will be worn in cold and intermediate cold regions and should be designed using state-of-the-art technology to protect to -15 F (-26.1 C). The other ensemble will be worn in extreme cold climates where temperatures can fall to -60 F (-51.1 C).

6R. Radiobiology

513,187
AD-A148 788/3/GAR PC **A02/MF A01**
University of Western Ontario, London. Dept. of Biochemistry.

Tissue Culture and In Vivo Modelling of Corneal Opacification and Ocular Injuries Induced by Millimeter Waves.
Annual rept. 1 Oct 80-30 May 81,
J. R. Trevithick. Jun 81, 15p
Grant DAMD17-80-G-9480

Conditions were established for in vitro culturing of rabbit corneas in preparation for experiments in which irradiation with millimeter waves would be performed in vitro. Alpha medium was found to be appropriate for culturing corneal epithelial cells and whole corneas for short periods up to one week. Incubation of corneas at elevated temperatures from 39-50 C resulted in progressive disruption of normal cell structure, beginning at low temperatures (39, 42) with apparent swelling of cells, loss of normal structure of microville, and depressed rather than raised cell junctions, and at higher temperatures (43 C, 50 C) to loss of microvilli, curling of cells and deepithelialization.

513,188
DE85002832/GAR PC **A02/MF A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Environmental Tritium Transport Model. Application to the Dose Evaluation for Members of the Public.
C. E. Murphy. 1984, 21p DP-MS-84-117, CONF-8410171-2
Contract AC09-76SR00001
US/Japan workshop on tritium radiobiology and health physics, Tokyo, Japan, 29 Oct 1984.

A model of tritium dispersion and cycling in terrestial ecosystems surrounding an atmospheric source of tritium is presented. The model structure is described. Results of simulations of three release cases are used to illustrate the dynamics of the model. The three cases are: a release of 100% TH, a release of 100% THO, and a release of 50% TH and 50% THO. The TH release is characterized by having a lower total retention of tritium in the ecosystem than the THO case. However, a greater fraction (but lower absolute amount) of the tritium in the TH release is found in the organic component of vegetation and the animals that feed on the vegetation. 24 references, 1 table. (ERA citation 10:003332)

513,189
NUREG/CR-3809-V1/GAR PC **A04/MF A01**
Battelle Pacific Northwest Labs., Richland, WA.
Performance Testing of Radiobioassay Laboratories: In-vitro Measurements, Pilot Study Report.
Technical rept.,
A. V. Robinson, D. R. Fisher, and R. T. Hadley. Dec 84, 72p PNL-5248-VOL-1, DOE/NBM-1071
Contract DE-AC06-76RL0-1830

The research program at the Pacific Northwest Laboratory entitled 'Technical Evaluation of Draft ANSI Standard N13.30, Performance Criteria for Radiobioassay' is jointly sponsored by the Nuclear Regulatory Commission and the Department of Energy. It is a nationwide, two-round bioassay intercomparison study to test the analytical performance of both in-vitro and in-vivo bioassay laboratories and determine their ability to meet the minimum performance criteria specified in the draft ANSI Standard. Round One is a Pilot Study involving a small number of voluntarily participating laboratories. Round Two will involve a larger number of laboratories and will expand on the results of Round One. This report, In-Vitro Measurements, is a review of the methodology and results of Round One. For this part of the research, test samples of artificial urine containing precisely known quantities of certain radionuclides were sent to 19 bioassay laboratories.

513,190
PB85-137479 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Gamma Ray Response of 'Opti-chromic' Dosimeters.
Final rept.,
B. B. Radak, and W. L. McLaughlin. 1984, 3p
Pub. in Radiation Physics and Chemistry 23, n6 p673-675 1984.

Commercially available 'Opti-chromic' dosimetry systems, consisting of radiochromic dye solutions in plastic tubing, were tested in terms of their response to (60)Co gamma radiation at various doses, dose rates, and temperatures, representative of those that might be encountered in typical radiation processing environments. Results of the tests are presented.

513,191
PB85-141448 Not Available NTIS
National Bureau of Standards, Gaithersburg, MD.
Improvement of Radiochromic Film Dosimetry Precision by Individual Dosimeter Characterization.
Final rept.,
R. M. Uribe, W. J. Chappas, and W. L. McLaughlin. 1984, 3p
Pub. in International Jnl. of Applied Radiation and Isotopes 35, n10 p995-997 1984.

Dosimeters supplied in large batches generally have intrinsic non-uniform response characteristics that can be improved by a technique of individual dosimeter characterization. Pre-use irradiation of radiochromic dye film dosimeters provides a simple method for reducing the standard deviation and error in making absorbed dose assessments. Through a simple pre-use uniform irradiation of a selection of dosimeters to a dose of 1.0 kGy, variability in the dosimeters' optical absorbances at a given wavelength and film-to-film variation in thickness are automatically included in an interpretation of subsequent unknown doses in the range 1-20 kGy. This technique reduces by about a factor of four the nominal error associated with routine radiochromic dye film measurements.

6S. Stress Physiology

513,192
AD-A148 643/0/GAR PC **A02/MF A01**
Saint Louis Univ., MO.
Altitude Exposure and the Role of Hypoxia and Arginine Vasopressin in Cerebral Fluid Dynamics.
Annual summary rept. 1 Mar-1 Dec 81,
L. C. Senay, and D. L. Tolbert. 1 Dec 81, 21p
Contract DAMD17-81-C-1044

Through exposure of rabbits (10) to barometric pressures equivalent to that encountered at 18,000 ft for 6-8 hours, we found no increase in water content of various parts of the brain (temporal, parietal, frontal cortices; thalamus, midbrain, hindbrain, cerebellum). We have found that the cerebrospinal fluid (CSF) pressure significantly increases when rabbits are exposed to hypoxia. We conclude that the initial change in CSF dynamics with hypoxia is an increase in CSF pressure. At present we do not know if this increase is due to an increase in CSF production and/or a decrease in clearance of CSF. The role of arginine vasopressin in this process is under study. Originator-supplied keywords include: Cerebroventricular cannulation.

513,193
AD-A148 644/8/GAR PC **A03/MF A01**
Saint Louis Univ., MO.
Altitude Exposure and the Role of Hypoxia and Arginine Vasopressin in Cerebral Fluid Dynamics.
Annual rept. Dec 81-28 Feb 83, Final rept. 1 Mar 81-28 Feb 83,
L. C. Senay, and D. L. Tolbert. 31 May 83, 39p
Contract DAMD17-81-C-1044

Through exposure of rabbits (V=10) to barometric pressures equivalent to that encountered at 18,000 ft for 6-8 hr, we found no increase in water content of various parts of the brain (temporal, parietal, frontal cortices; dien cephalon, mid-brain, hindbrain, cerebellum). Repeated exposure of rabbits (N=57) to hypoxia equivalent to 8,000 to 16,000 ft generally lead to an increase in CSF pressure. However, we found no influence of hypoxia upon CSF arginine vasopressin contents. When injected into the lateral ventricles of rabbits, arginine vasopressin, norepinephrine, prostaglandin E2 and prostaglandin F 1 alpha did not influence CSF pressures. Angiotensin II generally caused an increase in CSF pressure while saralasin, an AII blocker generally caused a decrease in CSF pressure when given by itself and prevented a rise in CSF pressure if given before AII. Injection of acetazolamide ito the lateral ventricles did not consistently alter CSF pressures but when given systematically, acetazolamide caused a decreae in CSF pressure in two thirds of the treated animals.

6T. Toxicology

513,194
AD-A148 726/3/GAR PC **A02/MF A01**
Naval Health Research Center, San Diego, CA.
Morbidity and Mortality Associated with Exposure to Otto Fuel II in the U.S. Navy 1966-1979.
Interim rept..
J. C. Helmkamp, S. A. Forman, M. S. McNally, and C. M. Bone. Aug 84, 24p Rept no. NAVHLTHRSCHC-84-35

This investigation assessed whether the morbidity and mortality previously associated with nitrated esters would be found in Torpedoman's Mates (TM) potentially exposed to Otto Fuel II. In the initial analysis, illness and/or death in 16 selected cardiovascular, neurologic, and toxic diagnoses were compared among potentially exposed TMs (and appropriate control groups) during the period 1966-1979. Hospitalization rates and confidence intervals were calculated and survival tables were used to calculate the probability of hospitalization. Estimates of age and occupational group-specific relative risks were then made to determine if there were any significant risk differences between study groups. There was no statistically significant excess of CVS morbidity or mortality in TMs. Lack of reliable PNEC information prior to 1970 may have introduced a selection bias that obscured the true Otto Fuel exposure experience of TMs. Additionally, the wide spectrum of disease conditions that may be associated with the use of Otto Fuel have known non-occupational risk factors and etiologies that could be confounding factors. To overcome these biases, a second analysis focused on three CVS (Cardiovascular System), conditions (acute myocardial infarction, angina pectoris and cardiac arryhthmias), known to be associated with analogous nitrated esters. Risk assessment analysis for the ten-year period (1970-1979) suggests that exposed TMs have a significantly greater risk of a CVS related hospitalization compared to other TMs and fire control technicians.

513,195
DE85000758/GAR PC **A02/MF A01**
Lawrence Livermore National Lab., CA.
Cocytotoxicity/Comutagenicity of Arsenic in a Chinese Hamster Ovary Triple Auxotroph.
R. T. Taylor, S. A. Stewart, and M. L. Hanna. 4 Jun 84, 16p UCRL-90332, CONF-8406143-3
Contract W-7405-ENG-48
18. annual conference on trace substances in environmental health, Columbia, MO, USA, 4 Jun 1984.
Portions are illegible in microfiche products.

Among four forms of As that are measurable in human tissues (arsenite, arsenate, monomethylarsonate, and dimethylarsinate), non-cytotoxic concentrations of arsenite specifically enhance cell killing by various mutagenic agents in a Chinese hamster ovary auxotroph that requires glycine + adenosine + thymidine (CHO AUXB1). Arsenite is cocytotoxic at low concentrations of 2 to 12 mu M. It is also the most growth rate inhibitory and cytotoxic of these As compounds, when each is incubated alone in AUXB1 cell cultures. None of these four As compounds are mutagenic per se, using an assay that we have developed to measure reversion to prototrophy at the FPGS gene locus. But arsenite (10 mu M) specifically enhances induced reversion by the direct acting chemical mutagens cis-Pt(NH sub 3) sub 2 Cl sub 2 , methylglyoxal, and glycidal with which it is also cocytotoxic. Its comutagenicity with other agents is being tested. The foregoing experiments represent the first systematic comparison in mammalian cells of As growth inhibition, cytotoxicity, and mutagenicity versus its chemical form. Moreover, they provide the first evidence for the specific cocytotoxicity/comutagenicity of trivalent As in a mammalian cell line. Our findings support the suggestion that one role of As in its association with cancer could be to serve as a cocarcinogen. By functioning as a comutagen, perhaps through the inhibition of DNA repair, trivalent As may increase the initiation of tumor formation by enhancing the mutagenic activities of a large collection of primary environmental carcinogens. 55 references, 11 figures. (ERA citation 10:003498)

513,196
DE85000840/GAR PC **A03/MF A01**
Battelle Pacific Northwest Labs., Richland, WA.

Epiderma Carcinogenesis Studies of Synthetic Fossil Fuel Materials in Mice: Comparison and Correlation with in Vitro Genotoxicity.
R. A. Renne, R. A. Peiroy, M. E. Frazier, B. W. Wilson, and D. D. Mahlum. Jun 84, 29p PNL-SA-11519, CONF-8406217-1
Contract AC06-76RL01830
Skin carcinogenicity: experimental and occupational aspects symposium, Rouen, France, 18 Jun 1984.
Portions are illegible in microfiche products.

Epidermal tumorigenic response in mice to solvent fractions of heavy distillate (HD) from a solvent-refined coal (SRC-II) process indicated that the basic tar and neutral tar were the most carcinogenically potent fractions. Assays of another SRC-II coal liquid that had been fractionally distilled indicated that the epidermal carcinogenicity of this material for mouse skin is due to that portion boiling above 700 exp 0 F, and that the carcinogenic potency of the material increases with boiling point. With some notable exceptions, carcinogenicity data for materials and fractions in chronic skin-painting assays correlated with genotoxic activity in microbial (Ames/Salmonella) and mammalian cell culture (Syrian hamster embryo) assay systems, and with carcinogenicity data in initiation/promotion (I/P) assays in mouse skin. 25 references, 6 figures, 2 tables. (ERA citation 10:003490)

513,197
DE85000870/GAR PC A02/MF A01
Jackson Lab., Bar Harbor, ME.
Improved Mutagen-Testing Systems in Mice. Comprehensive Progress Report, 1 September 1981-31 August 1984.
T. H. Roderick. 31 Aug 84, 21p DOE/EV/03267-19
Contract AC02-76EV03267

The purpose was to produce improved mutagen-testing systems in mice. Chromosomal inversion systems were induced and techniques improved to induce, detect, genetically define, and combine inversions in effective mutation-test systems. Recessive detrimentals and lethals induced in the validation-testing of these systems were studied. 7 references, 2 figures. (ERA citation 10:003482)

513,198
DE85002307/GAR PC A02/MF A01
Los Alamos National Lab., NM.
Preparation and Characterization of Lung-Cell Suspensions from Two Rodent Species.
J. S. Wilson, and J. E. London. Sep 84, 12p LA-10179-MS
Contract W-7405-ENG-36

Monodispersed suspensions of rodent lung cells provide a tool to assess pulmonary damage following exposure to known or suspected toxic gases, dusts, and vapors. Knowledge of the mechanisms of cellular damage as determined by structural or functional changes is prerequisite to understanding the progression of pulmonary disease or dysfunction. Dispersal of lung tissue into cellular suspensions began over 10 years ago. Mechanical, chemical, and enzymatic digestion have all been used to acquire cellular suspensions. The method we have developed uses a combination of collagenase digestion and mechanical dispersal to acquire suspensions with higher cell yields than previously reported; there are multiple cell types present and the cells seem to be highly viable even up to 4 h after harvest. The suspensions are being analyzed by flow cytometry for surface and intracellular organelle structure, as immunogen for the production of monoclonal antibodies, and for cell differentiation with light and electron microscopy. 14 references, 2 figures, 4 tables. (ERA citation 10:003403)

513,199
DE85002349/GAR PC A02/MF A01
Los Alamos National Lab., NM.
Toxicological Study of Uniset (UV-990-22-1).
J. E. London, and D. M. Smith. Sep 84, 6p LA-10239-MS
Contract W-7405-ENG-36

The acute oral LD sub 50 values for Uniset (UV-990-22-1) (Amicon, Lexington, Massachusetts) for rats and mice are greater than 5 g/kg. The material would be considered only slightly toxic or practically nontoxic in both species, according to classical guidelines. Eye irritation studies demonstrated UV-990-22-1 to be nonirritating. Primary skin irritation studies in the rabbit showed that the material was a moderate dermal contact irritant. The material did not induce sensitization in the intradermal guinea pig assay. 4 references, 1 table. (ERA citation 10:003487)

513,200
DE85002499/GAR PC A03/MF A01
Oak Ridge National Lab., TN.
Permissible Concentrations of Chemicals in Air and Water Derived from RTECS Entries.
T. D. Jones, P. J. Walsh, and E. A. Zeighami. 1984, 31p CONF-8410174-1
Contract AC05-84OR21400
Advances in health risk assessment for systemic toxicants and chemical mixtures meeting, Cincinnati, OH, USA, 23 Oct 1984.
Portions are illegible in microfiche products.

Many chemicals are of concern to human health, but only a few have epidemiologically derived risk estimates. About 45,000 chemicals are listed in the Registry of Toxic Effects of Chemical Substances (RTECS), most of which have had some testing in subhuman models. RTECS entries range from cellular effects through organoleptic damage to lethality, with many pathological endpoints including molecular changes, irritation, teratogenesis, cancer, mortality, etc. However, it is difficult to extend test results to risk assessments. If the results are extended, the degree of validity is highly uncertain. This paper describes a logical basis for using the entire complex spectrum of test results to evaluate the overall toxicological potency of a chemical to be assayed (i.e., an interviewing chemical), and how to derive tentative permissible concentrations in air and water for any particular chemical not having regulatory guidance. This approach has been tested for 16 reference chemicals discussed in NIOSH Criteria Documents, EPA-CAG reports, etc. 37 references, 3 figures. (ERA citation 10:003350)

513,201
DE85002802/GAR PC A03/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Uptake and Fate of Phenol and Aniline in Rainbow Trout and Daphnids During Single-Compound and Complex-Mixture Exposures.
D. D. Dauble, R. G. Riley, R. M. Bean, E. W. Lusty, and R. W. Hanf. Oct 84, 35p PNL-5264
Contract AC06-76RL01830

Studies were conducted of the potential for uptake and mobilization of phenol and aniline when presented as single compounds to the biouptake of these compounds within a complex water-soluble fraction (WSF) of a coal liquid. Estimated bioconcentration factors (BCF) of phenol-only exposures differed from BCFs obtained in the presence of the WSF. Differences in uptake could be due to competitive interactions among similar molecules for uptake and absorption, since phenolic compounds comprised nearly 90% of the soluble components in the complex mixture. Observed differences in unextractable exp 14 C residues suggested selective binding of phenol or metabolites to trout tissue storage sites. Differences in potential for bioaccumulation of phenol in complex mixtures were not consistent with estimates of BCF as determined by measured octanol/water coefficient values. In contrast to phenol, presence of coal-liquid water solubles did not significantly influence either the uptake or elimination of exp 14 C aniline by daphnids or trout. Identification of metabolites would provide useful information on potential differences in biotransformation and elimination mechanisms in complex organic mixtures. 15 references, 2 figures, 6 tables. (ERA citation 10:003489)

513,202
PB85-137073/GAR PC A09/MF A01
Research Triangle Inst., Research Triangle Park, NC.
Triethylene Glycol: Reproduction and Fertility Assessment in CD-1 Mice When Administered in the Drinking Water.
Final rept.,
J. R. Reel, and A. D. Lawton. 8 Nov 84, 191p RTI-124, NTP-84-407
Contract N01-ES-2-5014

In consideration of the National Toxicology Program's (NTP) goal of test development and validation, NTP has devised a chemical toxicity testing scheme for reproduction and development that should prove to be cost-effective, sensitive and accurate. This test system has been designated 'Fertility Assessment by Continuous Breeding' and provides a mechanism for evaluating chemical effects on male and female reproduction with extended exposures. The objective of this contract effort is to validate and refine this test system.

513,203
PB85-137123/GAR PC A09/MF A01
Research Triangle Inst., Research Triangle Park, NC.
Diethylene Glycol Monoethyl Ether: Reproduction and Fertility Assessment in CD-1 Mice When Administered in the Drinking Water.
Final rept.,
J. R. Reel, and A. D. Lawton. 8 Nov 84, 183p RTI-123, NTP-84-406
Contract N01-ES-2-5014

In consideration of the National Toxicology Program's (NTP) goal of test development and validation, NTP has devised a chemical toxicity testing scheme for reproduction and development that should prove to be cost-effective, sensitive and accurate. This test system has been designated 'Fertility Assessment by Continuous Breeding' and provides a mechanism for evaluating chemical effects on male and female reproduction with extended exposures. The objective of this contract effort is to validate and refine this test system.

513,204
PB85-138238/GAR PC A06/MF A01
Texas Tech Univ., Lubbock. Dept. of Physiology.
Infectivity Model Verification Studies - Annual Report, 1983,
J. J. McGrath. Sep 84, 106p CRC-CAPM-23-78-03
See also PB83-253872.

Texas Tech continued in 1983 to determine the level at which nitrogen dioxide increases susceptibility to respiratory infection and to determine the immune mechanism(s) that are most affected. A previous, frequently cited report by Ehrlich and Henry (1968) indicated that exposure to 0.5 ppm NO2 for three months depressed host resistance to Klebsiella pneumoniae infection. Texas Tech's studies during 1981 and 1982 failed to verify these results; furthermore, no excess mortality was found after Klebsiella pneumoniae challenge in mice exposed to up to 1.5 ppm NO2 for three months. During 1983, the results of using a dose-response bacterial challenge confirmed that exposure to 1.5 ppm NO2 for up to three months does not increase susceptibility to infection with Klebsiella pneumoniae. It was also noted that this level of exposure to NO2 does not increase susceptibility to an aerosol challenge with mouse-adapted influenza virus. The Texas Tech studies tend to suggest that NO2 does depress host resistance to bacterial infection at a level of exposure greater than 1.5 ppm, that the effect is transient rather than enduring, and that the target cell may be the alveolar macrophage.

513,205
PB85-140200/GAR PC A02/MF A01
Fish and Wildlife Service, Denver, CO. Denver Wildlife Research Center.
Problems and Recent Advances in the Development of Rodenticides,
P. J. Savarie. 1980, 19p BIOTROP/SP-12, AID-PN-AAK-191

As part of an effort to determine the basic physiological, biochemical, and toxological effects of rodenticides on target and nontarget species, this report describes chemicals that have been in use as rodenticides since 1965. The discovery in Great Britain and the United States of rats that are resistant to warfarin led to the development of new rodenticides effective against anticoagulant-resistant rodents; calciferol was developed to be incorporated into warfarin baits, but this combination is being replaced by difenacoum, brodifacoum, and bromadiolone, newer coagulants which are effective in single doses. A red squill formulation known as stabilized scilliroside has proved in both laboratory and field tests to be more effective than the older product known as fortified red squill. Attempts to increase the acceptability of norbormide by encapsulating it were unsuccessful; neither norbormide nor stabilized scilliroside have passed government requirements for effectiveness. Relatively new acute rodenticides include NK-15561 (used in Japan), phosacetim (use discontinued), UK-766 (laboratory-tested as toxic only to Norway rats), RH-787 (a vitamin antimetabolite also known as pyrinuron), and gliftor (developed in the Soviet Union). A 36-item bibliography (1960-77) is appended.

513,206
PB85-141422 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.

National Bureau of Standards Toxicity Test Method.
Final rept.,
B. C. Levin. Oct 84, 19p
Pub. in Proceedings of a Conference on Fire Safety Aspects of Products of Combustion/Hazard Assessment and Fire Testing, Baltimore, MD., Mar 20-23, 1983, p88-106 Oct 84.

The National Bureau of Standards is developing a small-scale test method to assess the acute inhalation toxicity of combustion products under specified laboratory conditions. This presentation on March 22, 1983 to the Spring Conference of the Fire Retardant Chemicals Association describes the current test method, its uses and limitations, and the future plans of the National Bureau of Standards to overcome these limitations. Aspects of the test method that were discussed in detail were the temperatures of combustion (25C above and below the autoignition temperature), the current combustion system and two radiant-energy combustion systems, the achievement of the test method's objective, and the reproducibility of results as determined by an interlaboratory evaluation of the test by seven laboratories.

513,207
PB85-146173/GAR PC **A02/MF A01**
Health Effects Research Lab., Cincinnati, OH.
Carcinogenic Activity of Acrylamide in the Skin and Lung of Swiss-ICR Mice.
Journal article,
R. J. Bull, M. Robinson, and J. A. Stober. 1984, 6p EPA/600/J-84/165
Pub. in Cancer Letters 24, p209-212 1984.

Doses of acrylamide ranging from 12.5 to 50 mg/kg were administered orally to female ICR-Swiss mice over a M, W & F for two weeks (total doses of 75, 150 and 300 mg/kg). Two weeks later some of the animals were begun on a promotion schedule involving the application of 2.5 micrograms TPA/mouse three times weekly. Development of tumors was observed weekly in the skin and in the lungs at one year. Acryiamide was found to initiate squamous cell adenoma and carcinomas in the skin and increased the yield of adenomas and carcinomas in the lung. Skin tumor development was dependent upon TPA promotion whereas lung tumor induction was not. These data extend previous observations of carcinogenic activity of acrylamide in the skin Sencar mice and lungs of strain A/J mice to a third strain of mouse the ICR-Swiss.

513,208
PB85-146827/GAR PC **A02/MF A01**
Environmental Research Lab., Narragansett, RI.
Toxicity of Arsenite and Arsenate to the Marine Macroalga 'Champia parvula' (Rhodophyta).
Journal article,
G. B. Thursby, and R. L. Steele. 1984, 10p EPA/600/J-84/181
Pub. in Environmental Toxicology and Chemistry, v3 p391-397 1984.

By a previously established test procedure that uses 4.5 micromoles phosphate in the medium, the marine red alga Champia parvula (C. Agardh) Harvey was shown to be more sensitive to arsenite (As(III)) than to arsenate (As(V)). Mature cystocarps (evidence of sexual reproduction) were formed when plants were exposed to 65 micrograms As(III)/L, but not when exposed to 95 micrograms As(III)/L. Three hundred micrograms As(III)/L was sufficient to kill C. parvula. Using the standardized test, plants grew just as well in 10,000 micrograms As(V)/L as they did in the controls; however, sexual reproduction did not occur at this concentration. Phosphate concentration up to 9.1 micromoles had little or no effect on As(III) toxicity. Arsenate toxicity, however, was inversely proportional to the amount of phosphate in the medium. In the absence of added phosphate, As(V) toxicity was similiar to that of As(III), except plants were still alive at 1,076 micrograms As(V)/L (although they did not grow).

513,209
PB85-854537/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Toxicity of Pesticides. 1982-January 1985 (Citations from the NTIS Data Base).
Rept. for 1982-Jan 85.
Jan 85, 247p
Supersedes PB83-804138.

This bibliography contains citations concerning occupational surveys, clinical investigations, and laboratory analyses pertaining to the toxic effects of pesticides. Topics include terrestrial and aquatic ecosystem responses, regulatory aspects, transport and metabolism, and registration standards and procedures. The detection of specific compounds and their effects on selected species are also discussed. (This updated bibliography contains 296 citations, 179 of which are new entries to the previous edition.)

7. CHEMISTRY

7A. Chemical Engineering

513,210
PB85-129864/GAR PC **E03/MF E01**
Foersvarets Forskningsanstalt, Umea (Sweden).
Undersoekning av Moejligheterna att Tillverka Aktivt Kol ur Inhemska Ravaror (Investigation of the Possibilities to Produce Active Carbon from Domestic Raw Products),
O. Granbom. Aug 84, 17p FOA-E-40014
Text in Swedish. See also PB85-129872.

A literature investigation was carried out to map the domestic raw products which can be used for preparation of active carbon. A large number of carbonaceous material can be used but the most important is wood, peat and coal, which are available within the country. The problem is that we have no know-how in respect to production of active carbon. The total need of active carbon in Sweden is low as well (about 1500 ton/year), why a production for the country's need only must be expensive. A further investigation of the use of active carbon in Sweden is suggested to map which qualities and quantitives are used. Attention must be devoted to the possibility of regeneration and when treatment with active carbon can be discarded or replaced with other adsorbing materials.

513,211
PB85-129872/GAR PC **E03/MF E01**
Foersvarets Forskningsanstalt, Umea (Sweden).
Undersoekning av Moejligheterna att Tillverka Kimroek ur Inhemska Ravaror (Investigation of the Possibilities to Produce Carbon Black from Domestic Raw Products),
O. Granbom. Aug 84, 21p FOA-E-40015
Text in Swedish. See also PB85-129864.

A literature investigation was carried out to map the domestic raw products, which can be used for preparation of carbon black. The investigation was directed towards a substitute for aromatic hydrocarbon mixtures extracted from petroleum or coal and used in the oil-furnace process. Such feedstock is used in the only plant for carbon black in Sweden (Nordiska Philblack AB in Malmo). A survey of the total domestic raw product resources in Sweden has been carried out but no resource great enough has been found. A potential raw product is lignine, which is a compound build up of aromatic structures. Lignine is a great resource which can be obtained from black liquor from sulphate cellulose plants and is therefore suggested to be investigated if it can be transformed to a feedstock for the oil furnace process. Also terpentine oil, which also contains aromatic compounds is suggested to be investigated even if this is a small resource. The importance of waste as a resource is pointed out. Thus it must be economical to hold a plant for recovery of rubber (together with carbon black) in readiness in case of blockade conditions.

7C. Organic Chemistry

513,212
AD-A148 617/4/GAR PC **A03/MF A01**
Naval Research Lab., Washington, DC.
Review of Specific Chemical Interactions for Hydrazine Analysis and Proposed Adaptation for Microsensor Chemical Detection.
Memorandum rept. Jan-Apr 84,
A. Snow, and S. Rose. 30 Nov 84, 37p Rept no. NRL-MR-5461

This report reviews the analytical chemistry of hydrazine and its methyl derivatives. The purpose is to develop chemical approaches for synthesis of hydrazine vapor specific coatings for chemical microsensors. Section 1 discusses basic hydrazine chemistry relevant to the analytical reactions presented in subsequent sections and to the coating requirements for chemical microsensors. Sections 2, 3, 4 and 5 discuss specific analytical hydrazine reactions which have been classified as aldehyde or ketone condensations, aromatic nucleophilic displacements, organic compound or metal ion reductions and organic dye interactions respectively. Section 6 presents chemical approaches suggested for microsensor coatings. Originator-supplied keywords include: Hydrazine detection, Reactive dyes, Chemical microsensor, Phthalocyanine, Colorimetric, and Reagents.

513,213
AD-A148 803/0/GAR PC **A03/MF A01**
Texas Christian Univ., Fort Worth. Dept. of Chemistry.
Synthesis and Reactivity of (Bis(trimethylsilyl)Methylene)(Mesityl)Phosphine.
Technical rept.,
X. M. Xie, P. Wisian-Neilson, and R. H. Neilson. 12 Dec 84, 26p Rept no. TCU/DC/TR-84-06
Contract N00014-79-C-0632

Two recent papers have described the synthesis and characterization of a series of P-mesityl substituted phosphorus compounds containing Si-N-P and/or Si-C-P linkages. These systems are of interest, in part, as precursors to new types of low-coordinate phosphorus compounds including (methylene) phosphines, RP-CR2 double bond, and imino (methylene) phosphoranes, RP(-NR)-CR2 double bonds. As an extension of these studies, we report here the synthesis and some derivative reactions of bis(Trimethylsilyl)methylene(mesityl)phosphine.

513,214
N85-12178/8/GAR PC **A02/MF A01**
Bayer A.G., Leverkusen (Germany, F.R.).
Vinyl Citrates from Citric Acid as New Monomers.
Final Report, Mar. 1982.
H. F. Muisers, and F. Mietzsch. Nov 83, 17p BMFT-FB-T-83-256
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The synthesis of citric acid vinyl esters and its homo and copolymerization properties were studied. Citric acid trivinyl ester cannot be built up directly with citric acid. Acetyl anhydro citric acid obtained by acetylation of citric acid can be converted to acetyl anhydro citric acid vinyl ester. Unlike vinyl acetate acetyl anhydro citric acid vinyl ester can be copolymerized with styrene. The copolymerization is not strictly alternating, allowing the ratio of the reacting components to be varied. The synthesis of the vinyl ester is relatively complicated, and is not competititve with vinyl acetate or other monomers.

7D. Physical Chemistry

513,215
AD-A148 597/8/GAR PC **A02/MF A01**
North Carolina Univ. at Chapel Hill. Dept. of Chemistry.
Kinetics of Electron Transfer Reactions in and at Films of Electroactive Polymers.
Technical rept.,
C. R. Leidner, R. H. Schmehl, P. G. Pickup, and R. W. Murray. 26 Oct 84, 8p Rept no. TR-9
Contract N00014-82-K-0337

Films of polymers and copolymers of transition metal complexes can be prepared on electrodes by reduction of vinyl substituted monomers like Ru(bpy) (vpy) and Os(bpy) (4-pyNHCOCH-CHPh). Using several methods, we have studied the transport of electrons through the mixed valent oxidation state of the films, and the electrocatalytic oxidation and reduction of other electroactive substances contacting the film

from the solution side. The interrelationship of the rate of these processes in electrocatalytic electrode design is also discussed.

513,216

AD-A148 654/7/GAR PC A02/MF A01
Utah Univ., Salt Lake City. Dept. of Chemistry.
Electrochemistry at Very High Potentials: The Use of Ultramicroelectrodes in the Anodic Oxidation of Short Chain Alkanes.
Technical rept.,
J. Cassidy, S. B. Khoo, S. Pons, and M. Fleischmann. 28 Nov 84, 20p Rept no. TR-29
Contract N00014-83-K-0470

The use of ultramicroelectrodes is aprotic solvent containing no purposefully added support electrolyte allows the observed anodic oxidation limit in acetonitrile to be considerable extended. The anodic oxidation of methane, butane, and other aliphatic alkanes is clearly observed under steady state conditions at potential up to about 3.8V (Ag+ reference). The oxidation of the solvent occurs significantly at potentials greater than 4.0V and appears to result in radical coupling reactions forming both soluble and insoluble polymers.

513,217

AD-A148 655/4/GAR PC A02/MF A01
Utah Univ., Salt Lake City. Dept. of Chemistry.
Voltammetry and Coulometry with Immersed Thin Layer Electrodes. Part 1. Model for Effects of Solution Resistivity in Linear Sweep Voltammetry.
Technical rept.,
A. S. Hinman, S. Pons, and J. Cassidy. 28 Nov 84, 23p Rept no. TR-30
Contract N00014-83-K-0470
See also Part 2, AD-A148 656.

In non-aqueous solvent/electrolyte systems, solution resistivities as high as 3000 ohm-cm may be encountered. The resulting potential distribution problems are particularly severe, and it was suggested that implementation of thin layer methodology, even in solvents of relatively high dielectric constant, such as acetonitrile or dimethylformamide, would be difficult. It is in such poorly conducting media that the advantages of thin-layer methodology may often be most beneficial, however. In this paper the application of thin layer voltammetry in non-aqueous media is considered. The discussion is centered around immersed thin layer electrodes, i.e. those in which the edges of the thin layer cavity are immersed in bulk solution, since a greater cross sectional area is available for the flow of current, and the resulting potential distribution is therefore less severe. Such cell designs always suffer to some extent from diffusion of electroactive material from the bulk solution into the thin layer cavity, but it will be demonstrated experimentally that this does not seriously affect the usefulness of results.

513,218

AD-A148 656/2/GAR PC A02/MF A01
Utah Univ., Salt Lake City. Dept. of Chemistry.
Voltammetry and Coulometry with Immersed Thin Layer Electrodes. Part 2. Practical Considerations and Experimental Results.
Technical rept.,
A. S. Hinman, S. Pons, and J. Cassidy. 28 Nov 84, 16p Rept no. TR-31
Contract N00014-83-K-0470
See also Part 1, AD-A148 655.

We have shown that geometrical considerations in the design of immersed thin layer electrochemical cells are important in the satisfactory performance of voltammetric experiments in solutions of high specific resistivity. In this paper, practical cell design and experimental results for a variety of systems are considered. In summary, we feel that reasonable care in the design of thin layer cells leads to the quantitative use of voltammetry and coulometry in systems with high specific resistivities. In the end, the effort is not much more than that required for conventional cyclic voltammetry, whereas the advantages of analysis using thin layer techniques are greater than those in conventional voltammetry.

513,219

AD-A148 658/8/GAR PC A03/MF A01
Utah Univ., Salt Lake City. Dept. of Chemistry.
Construction and Behaviour of Ultramicroelectrodes: Investigations of Novel Electrochemical Systems.
Technical rept.,
A. M. Bond, M. Fleischmann, S. B. Khoo, S. Pons, and J. Robinson. 28 Nov 84, 32p Rept no. TR-38
Contract N00014-83-K-0470

Methods of construction and the behavior of microdisc and microsphere electrodes having radii down to 1000 and 200 A respectively and of microspheres having widths down to 250 A are reviewed. The high steady state rates of mass transport and the low ohmic over potentials allow the study of systems under simple steady state conditions as well as the study of many novel systems. It is shown that the rates of fast electrode reactions can be readily measured; the kinetics of reactions in solution coupled to electrode reactions are more easily determined than by relaxation methods using planar electrodes; reactions can be examined in solvents using low or zero concentrations of support electrolyte as well as in low dielectric constant solvents.

513,220

AD-A148 659/6/GAR PC A02/MF A01
Utah Univ., Salt Lake City. Dept. of Chemistry.
FT-IR/PA Study of Quinoline Adsorbed on Calcined and Sulfided Mo/Gamma-Al2O3.
Technical rept.,
S. Bandyopadhyay, F. E. Massoth, S. Pons, and E. M. Eyring. 28 Nov 84, 25p Rept no. TR-35
Contract N00014-83-K-0470

Photoacoustic infrared spectra of quinoline adsorbed on gamma-alumina and on oxide and sulfided forms of Molybdenum/gamma-alumina are reported. In agreement with prior studies with pyridine, both Lewis and Bronsted acidic sites are detected on the oxide catalyst, but only Lewis sites are observed on the sulfided catalyst. Certain surface hydroxyl groups and some Lewis site Al3+ anionic vacancies appear to participate cooperatively in the binding of quinoline to the sulfided Molybdenum/gamma-alumina surface. A precursor to carbonium ions that does not involve a Bronsted acid site is postulated.

513,221

AD-A148 660/4/GAR PC A02/MF A01
Utah Univ., Salt Lake City. Dept. of Chemistry.
Subtractively Normalized Interfacial Fourier Transform Infrared Spectroscopy of Difluorobenzene Adsorbed at Polycrystalline Platinum Electrodes.
Technical rept.,
S. Pons, and A. Bewick. 28 Nov 84, 15p Rept no. TR-33
Contract N00014-83-K-0470

The subtractively normalized interfacial Fourier transform infrared spectra (SNIFTIRS) of the difluorobenzenes in perchloric acid solutions show that the species are absorbed flat at low concentrations of the substrate. In concentrated solutions, the packing changes to a skewed configuration. For these molecules there is no indication of vibrational coupling to the strong electrical field at the electrode surface and the vibrational spectra are as predicted by the standard surface selection rule.

513,222

AD-A148 661/2/GAR PC A03/MF A01
Utah Univ., Salt Lake City. Dept. of Chemistry.
Electrochemical Features of the Ferric Sulfate Leaching of CuFeS2/C Aggregates.
Technical rept.,
R. Y. Wan, J. D. Miller, J. Foley, and S. Pons. 28 Nov 84, 29p Rept no. TR-36
Contract N00014-83-K-0470

The rate of chalcopyrite dissolution by ferric sulfate solution can be enhanced by the presence of conductive carbon particles. The addition of carbon has been found to increase the leaching rate of chalcopyrite by as much as a factor of four. The importance of carbon in the enhanced leaching of chalcopyrite has been discussed in previous publications. The same rate increase has been found to prevail for the initial reaction kinetics. To further evaluate the effect of carbon during the initial stage of reaction, the results from initial rate experiments are discussed in conjunction with polarization and spectroelectrochemical measurements.

513,223

AD-A148 662/0/GAR PC A03/MF A01
Utah Univ., Salt Lake City. Dept. of Chemistry.
Spectroelectrochemical Investigation Oxidation of the Bilirubin IX-Alpa in Dimethylformamide.
Technical rept.,
J. R. Pradko, S. Pons, J. F. McAleer, and A. S. Hinman. 28 Nov 84, 39p Rept no. TR-32
Contract N00014-83-K-0470

This electrochemistry of bilirubin IX-alpha in N,N-dimethylformamide has been investigated by cyclic voltammetry, ac voltammetry, modulated specular reflectance spectroscopy, small amplitude ac reflectance spectroscopy, OTTLE cell spectroelectrochemistry, and conventional spectroscopy. The data suggest a CECEC mechanism for oxidation of bilirubin to biliverdin. The oxidation potential for the mono-deprotonated bilirubin to its cation radical is +0.10 V, and for the carbonium ion/free radical couple, -0.86 V vs Ag/Ag+ (0.10 M).

513,224

AD-A148 663/8/GAR PC A02/MF A01
Utah Univ., Salt Lake City. Dept. of Chemistry.
Infrared Spectroelectrochemical Study of Adsorbed Tetracyanoethylene Anions at a Platinum Electrode.
Technical rept.,
S. Pons, S. B. Khoo, A. Bewick, M. Datta, and J. J. Smith. 1984, 6p Rept no. TR-28
Contract N00014-83-K-0470
Pub. in Jnl. of Physical Chemistry, v88 n16 p3575-3578 1984.

No abstract available.

513,225

AD-A148 664/6/GAR PC A02/MF A01
Utah Univ., Salt Lake City. Dept. of Chemistry.
Adsorption of Acrylonitrile at a Gold Electrode: An EMIRS Measurement of the Electrochemical Stark Effect.
Technical rept.,
A. Bewick, C. Gibilaro, and S. Pons. 28 Nov 84, 19p Rept no. TR-39
Contract N00014-83-K-0470

Electrochemically modulated infra red spectroscopy of acrylonitrile adsorbed on a gold electrode in aqueous sulphuric acid shows potential - dependent unipolar absorption bands at 2130/cm and 1520/cm. These are ascribed to heavily red shifted C N- and C=C stretches from acrylonitrile adsorbed flat on the surface by means of the pi-electron system. These bands are forbidden by the surface selection rule but are made visible by an Electrochemical Stark Effect.

513,226

AD-A148 665/3/GAR PC A03/MF A01
Utah Univ., Salt Lake City. Dept. of Chemistry.
Modulated Surface Vibrational Spectroscopies at Electrode/Electrolyte Interfaces.
Technical rept.,
S. Pons, and A. Bewick. 28 Nov 84, 34p Rept no. TR-34
Contract N00014-83-K-0470

In this report, we will discuss the applicability of a new infrared vibrational probe to studies of the structure and orientations of molecular species at or near the electrode-solution interface and the dynamics of adsorption/desorption processes. Such studies have been virtually impossible with available instrumentation in the past due to the extremely large absorbance by the solvent/electrolyte system. Early investigations on electrochemical systems were thus attempted primarily with internal reflectance methods that did not require that the radiation pass through the bulk solvent/electrolyte system. This method is limited, however, due to the few choices of infrared-transport electrode materials (semiconducting materials or very thin metal films on insulating transparent salts and polymers) in addition to more stringent cell designs and electrode geometries.

513,227

AD-A148 666/1/GAR PC A03/MF A01
Utah Univ., Salt Lake City. Dept. of Chemistry.

Homogeneous Reaction Involving Components of Different Redox Couples. I. Theoretical Considerations and Digital Simulation.
Technical rept.,
S. Pons, S. B. Khoo, J. Janata, S. Feldberg, and J. K. Foley. 28 Nov 84, 27p Rept no. TR-37
Contract N00014-83-K-0470
See also 2, AD-A148 667.

Coupled heterogeneous electron transfer/homogeneous reactions occur in the electro-oxidation of certain anilines, and in association reactions of hydrocarbon anions with metal cations. If the adduct A sub m sub R is electroinactive, the resulting voltammogram is distorted in a way which is characteristic of the value of m. The derivation of the theoretical fluxes for these reactions and calculated normal potential pulse voltammograms are presented. The results are derived from both limiting flux and digital simulation considerations. (Author)

513,228
AD-A148 667/9/GAR PC **A03**/MF **A01**
Utah Univ., Salt Lake City. Dept. of Chemistry.
Homogeneous Reaction Involving Components of Different Redox Couples. 2. Polarographic Studies of the Interactions of Alkali Metal Cations with Anthracene and Fluoroanthene Dianions in N,N-dimethylformamide and Acetonitrile.
Technical rept.,
S. B. Khoo, S. Pons, J. Janata, S. Feldberg, and J. K. Foley. 28 Nov 84, 35p Rept no. TR-40
Contract N00014-83-K-0470
See also 1, AD-A148 666.

The polarographic behavior of mixtures of anthracene (An), fluoranthene (Fa) and alkali metal cations in N,N-dimethylformamide (DMF) or acetonitrile (ACN) indicates that the electrogenerated dianion of the hydrocarbon reacts with the metal cation in the diffusion layer to form ion complexes. This results, in the case of sodium or lithium cations with anthracene in both DMF and ACN, in the appearance of the invented polarographic waves. In the case of other alkali metal cations (K+, Rb+), the intensity of the polarographic wave due to the reduction to the hydrocarbon dianion is simply decreased. The stoichiometries and mechanisms of the interactions are discussed.

513,229
AD-A148 727/1/GAR PC **A02**/MF **A01**
Wayne State Univ., Detroit, MI. Dept. of Chemistry.
Effects of Heteroatom Substituents on the Properties of 1,2-Dioxetanes.
Technical rept.,
R. L. Handley, A. J. Stern, and A. P. Schaap. 4 Dec 84, 7p Rept no. ONR-TR-2
Contract N00014-82-K-0696

Nitrogen and sulfur-substituted dioxetanes exhibit dramatically lower activation energies for decomposition compared to the corresponding oxygen-bearing dioxetane. A mechanism involving intramolecular electron-transfer processes is proposed for the cleavage of these unstable dioxetanes. (Author)

513,230
AD-A148 783/4/GAR PC **A02**/MF **A01**
Army Ballistic Research Lab., Aberdeen Proving Ground, MD.
Multiphoton Photochemical and Collisional Effects during Oxygen Atom Flame Detection.
Final technical rept.,
A. W. Miziolek, and M. A. DeWilde. Oct 84, 24p BRL-TR-2604, SBI-AD-F300 512

A Nd:YAG pumped dye laser system was used to two-photon excite oxygen atoms at 225.6 nm in an atmospheric pressure CH4/N2o/N2 flame. Subsequent emission at 844.7 nm from the directly populated state, as well as a stronger emission at 777.5 nm due to the O(3p 3p to 3p 5p) collisional energy transfer process, was monitored. Two-photon resonant oxygen atom and hydrogen atom (656.3 nm) emissions were also observed in the absence of a flame. Closer examination revealed that the tightly focussed probe beam was producing these atoms by promoting multiphoton photolysis of the oxidizer, as well as fuel molecules. Thus, this type of laser diagnostic probe is potentially quite intrusive depending on the combustion region that is probed, as well as the laser energies used.

513,231
AD-A148 797/4/GAR PC **A02**/MF **A01**
Rochester Univ., NY. Dept. of Chemistry.
Application of the Density Matrix Multipole Expansion to Stark Quantum Beats from Beam-Foil-Excited Hydrogen Atoms,
F. Battaglia, and T. F. George. Apr 84, 11p AFOSR-TR-84-1137
Grant AFOSR-82-0046
Pub. in Nuovo Cimento D, v3 n4 p653-662 Apr 84.

No abstract available.

513,232
AD-A148 798/2/GAR PC **A02**/MF **A01**
California Univ., San Francisco.
Separation of Poly (ADP-Ribose) by High Performance Liquid Chromatography,
A. Hakam, J. McLick, and E. Kun. 1984, 10p
AFOSR-TR-84-1142
Contract F49620-81-C-0007
Pub. in Jnl. of Chromatolography, v296 p369-377 1984.

No abstract available.

513,233
AD-A148 799/0/GAR PC **A02**/MF **A01**
Oklahoma State Univ., Stillwater. Dept. of Chemistry.
Monte Carlo Random Walk Calculations of Unimolecular Dissociation of Methane,
R. Viswanathan, L. M. Raff, and D. L. Thompson. 29 Oct 84, 7p AFOSR-TR-84-1138
Grant AFOSR-82-0311
Pub. in Jnl. of Chemical Physics, v81 n7 p3118-3121 1984.

No abstract available.

513,234
AD-A148 811/3/GAR PC **A02**/MF **A01**
Indiana Univ. at Bloomington. Dept. of Chemistry.
Dioxododecaisopropoxytetratungsten. Oxygen Atom Abstraction from Acetone in Reactions with Hexaisopropoxyditungsten (M=M).
Technical rept.,
T. P. Blatchford, M. H. Chisholm, K. Folting, and J. C. Huffman. 29 Nov 84, 9p Rept no. INDU/DC/TR-84/2-MC
Contract N00014-79-C-0044

Hexaisopropoxyditungsten (W2(OPri)6(py)2) (M-M Triple bond) and acetone (1 equiv) react in hydrocarbon solvents and ambient temperatures to yield tetramethylethylene and Dioxododecaisopropxytetratungsten (W4O2(OPri)12) which is shown, by x-ray study, to be an unusual cluster type in which the 8 electrons available for M-M bonding are partitioned to a M-M triple and M-M single bond.

513,235
AD-A148 814/7/GAR PC **A03**/MF **A01**
Indiana Univ. at Bloomington. Dept. of Chemistry.
Comparative Studies on the Electronic Structures of W2(O2CH)4 and W2(O2CH)4-(CH3)2 by the Relativistic X Alpha-SW Method: A d3-d3 Metal Dimer with a Quadruple Metal-Metal Bond.
Technical rept.,
M. D. Braydich, B. E. Bursten, M. H. Chisholm, and D. L. Clark. 29 Nov 84, 35p Rept no. INDU/DC/TR-84/3-MC
Contract N00014-79-C-0044
Prepared in cooperation with Ohio State Univ., Columbus, OH. Dept. of Chemistry.

The bonding in W2(O2CR)4 and in the recently characterized W2(O2CR)4R'2 molecules are compared via Xalpha-SW calculations with quasi-relativistic corrections on the model system W2(O2CH)4 (I) and W2(O2CH)4(CH3)2 (II). Several questions concerning the electronic structure of II have been addressed; in particular, the apparently strong W-W bond in the presence of strong W-C bonds was of interest. It has been found that II is best considered as a W2(O2CH)4 fragment interacting with two CH3 radicals, a description consistent with the photochemical decomposition of W2(O2CEt)4(CH2Ph)2. The resulting W-W bond still remains the essential components of the quadruple bond in I. The W-W bonding remains strong in spite of strong axial ligation because of involvement of a higher-lying s-s sigma bonding orbital, an orbital whose contribution is more important in II than in I. It is the presence of this orbital, which is lower-lying for third-row metals than for first, which is believed to account for the structural difference between CR2(O2CR)4L2 and the W2(O2CR)4R2 systems.

513,236
DE84702879/GAR PC **A05**/MF **A01**
International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee.
File of Reference Data for Multiple-Element Neutron Activation Analysis. Software Data.
L. P. Kabina, I. A. Kondurov, and I. M. Shesterneva. Dec 83, 89p INDC(CCP)-216/LI
Translated from Russian.
U.S. Sales Only.

Data needed for planning neutron activation analysis experiments and processing their results are given. The decay schemes of radioactive nuclei formed in irradiation with thermal neutrons during the (n, gamma) reaction taken from the international ENSDF file are used for calculating the activities of nuclei and for drawing up an optimum table for identifying gamma lines in the spectra measured. (Atomindex citation 15:043200)

513,237
DE85000012/GAR PC **A02**/MF **A01**
Jackson State Univ., MS.
Spectroscopy of Trapped Molecular Ions. Progress Report, September 1, 1983-August 31, 1984.
1984, 19p DOE/ER/13134-1
Contract AS05-83ER13134
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A laser-induced fluorescence fast-flow system has been constructed which produces molecular ions through Penning ionization. The system was modified to increase the Ar triplet P (2) metastable concentration. Emission spectra of O sub 2+ and CO exp + were obtained using He metastables to excitive Penning Ionize O sub 2 and CO. A photoelectron electron gun was designed. (ERA citation 10:003609)

513,238
DE85000196/GAR PC **A02**/MF **A01**
Nevada Univ. System, Las Vegas. Desert Research Inst.
Investigation of Selected Water Quality Parameters in the Amargosa Drainage Basin.
B. Elliott. Aug 82, 23p DOE/NV/10162-18
Contract AC08-81NV10162
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The purpose of this investigation was to determine whether Amargoso Desert water quality meets established federal drinking water standards. Samples were collected at selected drinking water supply sites and were analyzed for inorganic chemical constituents and radioactivity. The findings indicate that no concentrations of radioactivity in the drinking water exceeded the standards; however, some naturally occurring chemical constituent analysis indicate concentrations above federal drinking water standards. 18 references, 3 figures, 4 tables. (ERA citation 10:003364)

513,239
DE85000199/GAR PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Symmetric Minimum Norm Updates for Use in Gibbs Free Energy Calculations.
D. E. Salane. Sep 84, 18p SAND-84-1790
Contract AC04-76DP00789

This paper examines a type of symmetric quasi-Newton update for use in nonlinear optimization algorithms. The updates presented here impose additional properties on the Hessian approximations which do not result if the usual quasi-Newton updating schemes are applied to certain Gibbs free energy minimization problems. The updates derived in this paper are symmetric matrices which satisfy a given matrix equation and are least squares solutions to the secant equation. A general representation for this class of updates is given. The update in this class which has the minimum weighted Frobenius norm is also presented. (ERA citation 10:001550)

513,240
DE85000586/GAR PC **A02**/MF **A01**
National Science Foundation, Washington, DC.

Applicability of Laboratory Kinetics Studies to the Evaluation of Aqueous Phase Atmospheric Oxidation of Sulfur-IV.
G. Tesi, and S. E. Schwartz. 1984, 6p BNL-35208, CONF-8405248-1
Contract AC02-76CH00016
Workshop on heterogeneous atmospheric chemistry, Vienna, Austria, 7 May 1984.

An overall problem facing atmospheric chemistry concerns the mechanism whereby gaseous precursors are oxidized and incorporated into atmospheric liquid water. There are two classes of pathways: gas phase oxidation, soluble product and solution in water; and gas phase species, solution in water and oxidation. The objective of this project is to ascertain the mechanisms and reaction rates of these processes in the atmosphere. This research focuses on processes involving aqueous phase chemical reactions and will evaluate reaction rates of these process in the atmosphere on the basis of measured and modeled reagent concentrations. 3 figures. (ERA citation 10:003249)

513,241
DE85000852/GAR PC **A02/MF A01**
Lawrence Livermore National Lab., CA.
Vibrational Relaxation in H sub 2 Molecules by Wall Collisions: Applications to Negative Ion Source Processes.
A. M. Karo, J. R. Hiskes, and R. J. Hardy. Oct 84, 24p UCRL-90943, CONF-841218-1
Contract W-7405-ENG-48
31. national vacuum symposium, Reno, NV, USA, 3 Dec 1984.

In the volume of a hydrogen discharge, H sub 2 molecules, excited to high vibrational levels (v" > 6), are formed either by fast-electron collisions or from H sub 2+ ions that are accelerated across the discharge-wall potential that undergo Auger neutralization prior to impact with the discharge chamber wall. We have used computer molecular dynamics to study the de-excitation and re-excitation of vibrationally-excited H sub 2 molecules undergoing repeated wall collisions. The initial translational energies range from thermal to 100 eV and the initial vibrational states range from v" = 2 to v" = 12. The average loss or gain of vibrational, rotational, translational, and total molecular energies and the survival rates of the molecules have been evaluated. At thermal energies vibrational de-excitation is the predominant process, and a consistent picture emerges of rapid energy redistribution into all the molecular degrees of freedom and a slower rate of loss of total molecular energy to the wall. At higher translational energies (1 to 100 eV) a substantial fraction of the molecules survive with large (v" > 6) vibrational energy. This vibrational population provides a contribution to the total excited vibrational population comparable to that from the fast-electron collision process. (ERA citation 10:001377)

513,242
DE85001405/GAR PC **A05/MF A01**
Los Alamos National Lab., NM.
User's Manual for GRIZZLY.
J. Abdallah. Sep 84, 79p LA-10244-M
Contract W-7405-ENG-36
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This manual describes the first release of GRIZZLY, a computer program to construct tables of atomic data for use in applications programs. The first release of GRIZZLY has the capability to generate baseline equation-of-state tables for elements and mixtures using various physical models. GRIZZLY runs on the Los Alamos CRAY-1 computers. 23 references. (ERA citation 10:004133)

513,243
DE85001594/GAR PC **A03/MF A01**
Wisconsin Univ.-Madison. Dept. of Chemical Engineering.
Microstructural Analysis of Ion Containing Polymers. Final Report, July 1, 1981-June 30, 1984.
S. L. Cooper. Jul 84, 32p DOE/ER/10922-T1
Contract AC02-81ER10922
Portions are illegible in microfiche products.

The microstructure of several ionomer systems has been investigated using techniques which probe different aspects of the structure. A liquid-like hard-sphere interparticle scattering model was proposed for the ionic domain morphology and has been shown to be superior to intra-particle scattering models in the literature. The result of applying this model to the experimental SAXS data implies that the ionic domain structure is determined by the polymer backbone and comonomer group anion but is independent of overall ion content, temperature and type of cation. EXAFS analysis has shown drastic differences in the local cation environment between momovalent alkali metal and divalent transition metal cations. More subtle differences were observed between cations in Nafion and those in sulfonated polystyrene ionomers (SPS). Two well-ordered near-neighbor shells were evident for the Zn exp 2+ cation in SPS. A coordination structure based on the EXAFS data has been proposed for the Zinc-sulfonate groups in the SPS ionomer. This model is also consistent with the SAXS analysis. (ERA citation 09:050175)

513,244
DE85001813/GAR PC **A02/MF A01**
Kentucky Univ., Lexington.
Fundamental Study of Catalysts Using Laser Raman, Infrared, Auger Electron Spectroscopy and Low Energy Electron Diffraction. Final Report, June 1, 1979-May 31, 1984.
E. B. Bradley, and K. A. Arunkumer. 1984, 12p DOE/ER/10447-4
Contract AS05-79ER10447

This research has covered the areas of (a) surface laser Raman spectroscopy (b) LEED (low energy electron diffraction), (c) auger spectroscopy, and (d) thermal desorption spectroscopy. These techniques were used to study structure and desorption of simple molecules adsorbed on nickel and cobalt crystals. Infrared spectroscopy was used to check gas purity. Greatest emphasis was given to surface laser Raman spectroscopy because of its potential to become an important addition to the arsenal of surface probes. (ERA citation 10:003607)

513,245
DE85001843/GAR PC **A02/MF A01**
Argonne National Lab., IL.
Multiparticle 3D Imaging Technique to Study the Structure of Molecular Ions.
W. Koenig, A. Faibis, E. P. Kanter, Z. Vager, and B. J. Zabransky. 1984, 22p CONF-841117-16
Contract W-31-109-ENG-38
Conference on the application of accelerators in research and industry, Denton, TX, USA, 12 Nov 1984.
Portions are illegible in microfiche products.

When energetic molecular ions (E/sub ion/ = 0.1 to 0.5 MeV/amu) pass through thin solid targets a Coulomb explosion ensues due to the rapid (approx. 10 exp -17 s) stripping of the valence electrons. This process has been successfully used to derive stereochemical information on diatomic and on selected triatomic ions. In order to investigate more complex molecular ions as well as to obtain more accurate and detailed structure information, a large area, multiparticle, position- and time-sensitive detector has been developed to detect all atomic fragments in coincidence. The requirement of multiparticle detection independent of the relative particle positions leads to a rather complex data-readout and -reduction system containing approx. 650 analog-to-digital conversions per event. The system relies heavily on techniques developed for high energy physics experiments during recent years. The single event resolution of the apparatus with respect to bond-lengths and -angles has been studied by Monte Carlo simulations and is typically a few percent. (ERA citation 10:003604)

513,246
DE85002373/GAR PC **A03/MF A01**
Battelle Pacific Northwest Labs., Richland, WA.
Coincidence Studies of Secondary Electron Emission in Light Ion-Atom Collisions.
R. D. DuBois. Jul 84, 29p PNL-SA-12495, CONF-8408110-2
Contract AC06-76RL01830
Workshop on high-energy ion-atom collision processes, Debrecen, Hungary, 27 Aug 1984.

Detailed information about the energy loss mechanism requires knowledge of total cross sections for target ionization as well as electron emission probabilities as a function of electron energy and emission angle. The differential measurements provide stringent tests for theoretical models used to describe the collisional process. However, electron emission spectra are in many cases quite complicated due to the possibilities of electron emission from inner as well as outer shells, multiple electron emission in a single collision, electron emission from the projectile as well as from the target in the case of structured particle impact, and the possibility of electron emission resulting from charge transfer mechanisms. In certain cases, the contributions of these individual mechanisms can be extracted from non-coincidence electron emission data; but in other cases, only coincidence methods can separate the various components. To date, most of our knowledge about collisional ionization mechanisms has been obtained from analyzing non-coincidence data. In some cases, coincidence measurements have supplemented this data. The author discusses some specific experimental work that demonstrates how coincidence data can aid in our understanding of ionization mechanisms. In general, the author restricts his discussion to high energy proton or helium ion impact on atomic targets where the ionization is observed through the emitted electron spectrs. 29 references, 16 figures. (ERA citation 10:003631)

513,247
DE85002471/GAR PC **A02/MF A01**
Oak Ridge National Lab., TN.
SANS (Small-Angle Neutron Scattering) Studies of Polymers.
G. D. Wignall. Oct 84, 11p CONF-8410112-1
Contract AC05-84OR21400
Symposium on polymer research at synchrotron radiation sources, Upton, NY, USA, 29 Oct 1984.
Portions are illegible in microfiche products.

Before small-angle neutron scattering (SANS), chain conformation studies were limited to light and small angle x-ray scattering techniques, usually in dilute solution. SANS from blends of normal and labeled molecules could give direct information on chain conformation in bulk polymers. Water-soluble polymers may be examined in H sub 2 O/D sub 2 O mixtures using contrast variation methods to provide further information on polymer structure. This paper reviews some of the information provided by this technique using examples of experiments performed at the National Center for Small-Angle Scattering Research. (ERA citation 10:002760)

513,248
DE85002534/GAR PC **A02/MF A01**
Rensselaer Polytechnic Inst., Troy, NY. Dept. of Physics.
Photon Scattering and Interaction Analysis of Interfacial Corrosion and Catalysis. Technical Progress Report, September 1983-30 September 1984.
T. E. Furtak. 1984, 10p DOE/ER/12032-03
Contract AC02-82ER12032

We have made significant progress toward the understanding of the surface enhanced Raman effect, in particular, to the short-range component of the enhancement. We now know that this phenomenon is related to active complexes whose electronic characteristics are defined by co-absorbed species from the solution. We have learned how to minimize the confusing effects of active complexes and to study vibrational phenomena on electromagnetically active surfaces which do not have significant population of active complexes. This will allow us to employ the SERS effect as a more general analytical tool. Progress was made toward an integrated optical approach to thin film studies through experimental and theoretical success with the photovoltage technique. We are able to relate induced defects in an oxide film to spectral features in the photovoltage and to modifications of the transient behavior of the signal. These defects are associated with film stability and protective behavior. Other new initiatives are progressing as planned. Work is described on our scanning ellipsometer, the in situ infrared tests, and in our plans for in situ surface EXAFS. We also describe preliminary results of second harmonic generation on oxidized metals. (ERA citation 10:003608)

513,249
DE85002733/GAR PC **A02/MF A01**
Argonne National Lab., IL.
K And L-Shell Cross-Sections for X-Ray Microanalysis in an AEM.
N. J. Zaluzec. Oct 84, 12p CONF-840767-8
Contract W-31-109-ENG-38
Microbeam Analysis Society analytical electron microscopy meeting, Bethlehem, PA, USA, 19 Jul 1984.
Portions are illegible in microfiche products.

The topic of ionization cross-sections appropriate for application to the Analytical Electron Microscope has recently become a subject of renewed interest in x-ray microanalysis. A new set of parameterizations developed for both K and L-Shell calculations is presented which overcomes the detrimental aspects of previous formulations and is applicable for elements ranging from Oxygen to Uranium for accelerating voltages appropriate to the AEM environment. (ERA citation 10:003603)

513,250
N85-12119/2/GAR PC **A06/MF A01**
Technische Hochschule, Darmstadt (Germany, F.R.).
Influence of Structural Parameters of Zeolite Catalysts on Their Activity and Selectivity.
Final Report, Dec. 1981.
C. P. Haelsig, H. Litterer, P. Kredel, T. Fleckenstein, and Nov 83, 108p BMFT-FB-T-83-253
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The influence of modifications of H-mordenite catalysts on their activity and selectivity was studied using isomerization of n-Hexane and of n-Hexene, and disproportionation of toluene. The properties of zeolites as catalysts depend on the ratio ViO2/Al2O3 and can be varied in a defined way by temperature treatment, addition of platinum and treatment in fixed beds of different geometry. Using the results, it is possible to select suitable modifications of H-mordenite catalysts for the mentioned reactions.

513,251
N85-12120/0/GAR PC **A04/MF A01**
Battelle-Inst. e.V., Frankfurt am Main (Germany, F.R.).
Research and Development Work on a Single Cation Specific Membrane for the Recovery of Raw Materials with Electrodialysis.
Final Report, Sep. 1983.
C. Tiby, H. Behret, W. Ronge, H. Binder, and H. Deibig. Aug 84, 58p BMFT-FB-T-84-163
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Homogeneous organic membranes with various copper complexes were produced by polymerization or condensation. Three experimental set ups were developed to investigate the copper-ion transport properties. Membranes produced on the basis of 8-hydroxychinoline complexes (N2O2 - complexes) show no specific copper transport properties. For membranes characterized by oxygen binding ligands (ionotrope membrane, Cu-salicylaldehyde membrane, Cu-maleinacid-membrane) a preferred Cu2+-ion transport up to 38% is found over a period of 30 hr.

513,252
N85-12121/8/GAR PC **A05/MF A01**
Battelle-Inst. e.V., Frankfurt am Main (Germany, F.R.).
Transport Phenomena in the Boundary Layer During Solution Solidification under Microgravity. Ice Growth from a Water-Salt Solution.
Final Report, Dec. 1983.
C. Tiby, H. Erdmann, Aug 84, 97p BMFT-FB-W-84-031
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

A laboratory cell was constructed to investigate ice growth in a water-salt solution. A Mach-Zehnder interferometer is used to determine the growth-velocity of the icefront and to measure the quasistatic density in front of the ice crystal. The vertical temperature profile across the cell can be examined with thermistors. Results of examination of the salt diffusion layer agree qualitatively with theoretical calculations. The quantitative difference shows the influence of microgravity.

513,253
N85-12465/9/GAR PC **A03/MF A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Nasa Redox Storage System Development Project.
Final Report.
N. H. Hagedorn. Oct 84, 48p NAS 1.15:83677, E-2125, NASA-TM-83677
Contract DE-AI04-80AL-12726

The Redox Storage System Technology Project was jointly supported by the U.S. Department of Energy and NASA. The objectives of the project were to develop the Redox flow battery concept and to probe its technical and economic viability. The iron and chromium redox couples were selected as the reactants. Membranes and electrodes were developed for the original mode of operating at 25 C with the reactants separated by an ion-exchange membrane. Analytical capabilities and system-level operating concepts were developed and verified in a 1-kW, 13-kWh preprototype system. A subsequent change was made in operating mode, going to 65 C and using mixed reactants. New membranes and a new electrode catalyst were developed, resulting in single cell operation as high as 80 mA/sq cm with energy efficiencies greater than 80 percent. Studies indicate a likely system cost of about $75/kWh. Standard Oil of Ohio (Sohio) has undertaken further development of the Redox system. An exclusive patent license was obtained from NASA by Sohio. Transfer of Redox technology to Sohio is supported by the NASA Technology Utilization Office.

513,254
N85-12675/3/GAR PC **A04/MF A01**
UKAEA Atomic Energy Research Establishment, Harwell (England).
Emission Mechanisms in the Liquid Metal Ion Source: A Review.
P. Marriott, and J. C. Riviere. Jul 84, 69p AERE-R-11294

Evidence is presented and compared in order to review the current understanding of the emission mechanisms in the liquid metal ion source. Energy distributions, neutral particle emission, and optical emission are considered, and the mechanisms proposed for the production of ionized atmos, molecules, droplets, and neutral particles are discussed.

513,255
PB85-136448/GAR PC **E04/MF E01**
Statens Levnedsmiddelinstitut, Soeborg (Denmark).
Aminosyreindholdet i Danske Levnedsmidler (Amino Acid Content of Danish Foods),
H. Soendergaard. Nov 84, 35p ISBN-87-503-5249-0, PUB-98
Text in Danish.

An account is given of an examination of the occurrence of nitrogen (N) and of 18 amino acids in a wide range of food products. A total of 341 samples of 179 different kinds of foods have been examined. The samples were bought in the retail shops in different seasons. Nitrogen has been determined by Kjeldahl analyses, whereas the amino acid determinations have been performed microbiologically. The pre-treatment of the samples has been carried out by acid hydrolysis, and by alkaline hydrolysis in the case of tryptophan.

513,256
PB85-137313/GAR PC **E03/MF E03**
Institut Franco-Allemand de Recherches, Saint-Louis (France).
Controle Holographique des Particules Emises par l'Iniecteur TSI 3050 (Holographic Control of Particles Emitted by the TSI 3050 Injector),
J. Juret, H. Royer, and J. Haertig. 23 Aug 83, 25p N-611/83
Text in French, summaries in French and German.

The note describes tests in which the particles generated with a TSI, Type 3050 generator were visualized holographically. This generator was to generate particles with uniform diameter which can be adapted to different parameters. The particles did exhibit the expected diameter at the diaphragm outlet of the generator, but it was also found that the droplets agglomerated quite rapidly. A modification is therefore suggested in the mode of operation of this generator so as to obtain useful particles with uniform diameter, without using the lid suggested by the builder which, when not secured accurately, at times interrupts the particle flow.

513,257
PB85-137339/GAR PC **A14/MF A01**
Environmental Research Lab.-Duluth, MN.
Summary Report of the Workshop on Structure Activity Concepts in Environmental Sciences.
M. W. Meader. Dec 84, 308p EPA/600/D-84/284

The theoretical and practical considerations in the application of structure-activity relationships (SAR) to chemical hazard assessment have been the subject of much research and debate. In order to focus this research on producing the most cost-effective methods of chemical evaluation, EPA sponsored a workshop on SAR in Environmental Sciences in San Antonio, Texas. Experts from industry, academia and government were invited to examine the state-of-the-art of current SAR methods, the limitations of SAR for EPAs mission, and develop research priorities for SAR over the next two years. This report is a summary of the workshop findings.

513,258
PB85-137347/GAR PC **A07/MF A01**
Union Carbide Corp., Tonawanda, NY. Linde Div.
Sludge Demetalization by the Union Carbide Corporation Electrochemical Process.
O. W. Haas. Dec 84, 149p EPA/600/2-84/196
Contract EPA-68-03-2968

Laboratory-scale apparatus was designed and constructed to evaluate an electrochemical sludge demetalization process developed by Union Carbide to determine the desirable electrode and cell configurations which would remove the metals such as cadmium, nickel and zinc from municipal wastewater sludge. The quantity and quality of data obtained showed that the process was feasible but that additional work was necessary to make the process a production process. Economics which were established based on the small amount of data obtained, indicated that the cadmium could be substantially removed at a piece of about 100 dollars per dry ton of sludge, which is not considered economically attractive at this time.

513,259
PB85-138220 Not available NTIS
Michigan State Univ., Hickory Corners. W.K. Kellogg Biological Station.
UV-Sensitive Complex Phosphorus: Association with Dissolved Humic Materials and Iron in a Bog Lake.
Journal article,
D. Francko, and R. Heath. c1982, 9p CONTRIB-450, EPA/600/J-82/440
Grant EPA-R-801936
Prepared in cooperation with Kent State Univ., OH. Dept. of Biological Sciences.
Pub. in Limnology and Oceanography 27, n3 p564-569 1982.

The concentration of UV-sensitive complex phosphorus compounds in water from an acid bog lake was linearly related to the concentration of dissolved high molecular weight humic material (DHM) both seasonally and diurnally. The first-order rate of photoreduction (Fe(+3) to Fe(+2) of DHM. . iron equaled the rate of release of orthophosphate (SRP) from these compounds. The rate of photoreduction of DHM. . iron was the same as the rate of photoreduction of ferric citrate under similar conditions. Reduced DHM. . iron was auto-oxidizable (Fe(+2) to Fe(+5); ferrous citrate was not. These data support the view that orthophosphate sorbed to ferric iron. . DHM complexes may be released by a mechanism involving UV-induced photoreduction of ferric iron to the ferrous state.

513,260
PB85-138626/GAR PC **A06/MF A01**
Battelle Pacific Northwest Labs., Richland, WA.
Hazardous Air Pollutants: Wet Removal Rates and Mechanisms.
Final rept.,
M. T. Dana, R. N. Lee, and J. M. Hales. Dec 84, 106p EPA/600/3-84/113

Fourteen hazardous organic air pollutants were evaluated for their potentials to be wet deposited by precipitation scavenging. This effort included a survey of solubilities (Henry's Law constants) in the literature, measurement of solubilities of three selected species, development and documentation of a general deposition model (MPADD) which includes dry deposition and plume depletion, and performance of scavenging field experiments to provide a data base for testing the model. Solubility parameters (dimensionless ratio of aqueous concentration to air concentration) for ethylene oxide, nitrobenzene, and methyl chloroform were measured in rainwater at two temperatures each Four field experiments were conducted: three using nitrobenzene and one involving methyl chloroform. Agreement of measured concentrations with model-calculated values was good for nitrobenzene, despite larger than desired experimental uncertainties during two of the releases. Analytical difficulties resulted in only a few measurements of methyl chloroform rainwater concentrations; these however, were in general agreement with model calculations and expectations on the

basis of its much lower solubility than that of nitrobenzene. These results and sample test runs of the Multi-Pollutant Atmospheric Deposition and Depletion (MPADD) model, including dry deposition estimates, show that wet deposition should have little effect on plumes of non-reactive hazardous gases within kilometers of their sources.

513,261
PB85-139525/GAR PC E04/MF E04
Science and Engineering Research Council, Chilton (England). Rutherford Appleton Lab.
Measurement and Fitting of Spectrum and Pulse Shapes of a Liquid Methane Moderator at IPNS,
J. M. Carpenter, R. A. Robinson, A. D. Taylor, and D. J. Picton. c1984, 30p RAL-84-082
Supersedes DE84-003678. Prepared in cooperation with Argonne National Lab., IL., Los Alamos National Lab., NM., and Birmingham Univ. (England).

The absolute intensity, energy spectrum and energy variation of the neutron pulse shape have been measured for the IPNS liquid methane 'F' moderator, at 108K. The spectrum has been corrected for attenuation by aluminium in the beam and has been fitted using a simple parametric description. The pulse shapes have been fitted to a function which is the sum of two decaying exponentials convoluted with a gaussian. These shapes have been corrected for instrumental resolution, parameterised as a function of neutron wavelength, and compared to the results of Monte Carlo simulations for equivalent moderator geometry. Only four parameters are required to describe the normalized spectrum and, in addition to wavelength dependent time delays, only five wavelength independent parameters are needed to describe the variation of the pulse shape over the entire spectrum. (Copyright (c) Science and Engineering Research Council 1984.)

513,262
PB85-139988 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Physical Basis for Piezoelectricity in PVDF.
Final rept.,
M. G. Broadhurst, and G. T. Davis. 1984, 11p
Pub. in Ferroelectrics 60, p3-13 1984.

The molecular and bulk structures of PVDF and related semicrystaline polymers are reviewed, and the effects of processing to make transducer films is discussed. A novel way of analyzing the elastic and piezoelectric constant data is introduced. The results of the analysis are shown to support the conclusion that thickness changes contribute about 2/3 of the piezoelectric activity. An increase in thickness decreases the charge on the electrodes. The probable mechanism is simply the motion of the electrodes in the fields of the constant dipole moments of the crystals. The remaining 1/3 of the activity is attributed to changes in the film's dipole moment at constant thickness. Strains in the orientation direction of the film increase the charge on the surface while strains in the plane of the film normal to the orientation direction decrease it. Eight separate possible contributions to the change in moment are discussed, and qualitative evaluations of their importance are given.

513,263
PB85-140465 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Comparison of Spreading Resistance Correction Factors as Calculated from Continuum and Finite-Layer Models.
Final rept.,
J. Albers. 1979, 1p
Sponsored by Defense Advanced Research Projects Agency, Arlington, VA.
Pub. in Jnl. of the Electrochemical Society 126, n8 p374 1979.

A continuum formulation of spreading resistance correction factors is derived in the limit as the layer thickness approaches zero. The correction factors calculated from the continuum equations for an exponentially varying resistivity are compared with the correction factors obtained from the finite layer equations.

513,264
PB85-140523/GAR PC E06/MF E06
Office National d'Etudes et de Recherches Aerospatiales, Chatillon-sous-Bagneux (France).
Caracterisation de la Structure du Reseau d'une Resine Epoxy Durcie (Structure Charactertzation of the Lattice of a Hardened Epoxy Resin),
B. Bloch. Apr 84, 153p TR-3/3346/M
Text in French.

Work done within the framework of this contract aimed at demonstrating and defining the importance of the various physicochemical examination techniques to characterize the structural condition evolving from polymertzation of a heat-hardenable resin, i.e. the state in which it can assume its role of a composite material matrix. The techniques investigated were infrared spectrography with Fourier transform and high resolution magnetic nuclear resonance of (sup 13)C and (sup 15)N both in solution and in the solid state, so as to analyze the formation mechanisms and the chemical structures of the lattice; paramagnetic electronic resonance (RPE) to evaluate the molecular mobilities, and finally electron microscopy to characterize morphology, i.e. the supermolecular structures. They were applied to the study of a simple resin, but one representative of most of the high-performance epoxy systems used at present in the aeronautics industry, the tetraglycidyl-methylene-dianiline TGMDA (Lopar B 3302, CdF chemistry) -diamino-diphenyl sulfone DDS. The variations brought to this system concerned the hardener content (stoichiometric concentration, or 60% thereof), and the boiling cycle (level and duration of an intermediate temperature stage).

513,265
PB85-140952 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Expansion Factor of a Part of Polymer Chain in Good Solvent Measured by Small Angle Neutron Scattering.
Final rept.,
Y. Matsushita, I. Noda, M. Nagasawa, C. C. Han, and T. P. Lodge. 1984, 5p
Sponsored by Ministry of Education, Science and Culture, Tokyo (Japan).
Pub. in Macromolecules 17, n9 p1785-1789 1984.

The radii of gyration of deuterium labelled parts in polystyrenes with narrow molecular weight distributions in good solvent (carbon disulfide) were determined by small angle neutron scattering (SANS). The expansion factors of the labelled parts were calculated from the observed radii of gyration and their unperturbed ones which were estimated from the unperturbed radius of gyration-molecular weight relationship of polystyrene in the literature. The expansion factors of the labelled parts were smaller than those of the whole chains, but were larger than that of a whole chain with the same molecular weight as that part. This result is reasonable compared with a Monte Carlo calculation in the literature and also with the perturbation theory.

513,266
PB85-140960 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Stochastic Dynamics Simulation of Particle Aggregation.
Final rept.,
R. D. Mountain, and G. W. Mulholland. 1984, 4p
Pub. in Proceedings of International Topical Conference on Kinetics of Aggregation and Gelation, Athens, GA., April 2-4, 1984, p83-86.

The kinetics of cluster aggregation and the structure of the resulting clusters have been studied using a 'Brownian dynamics' simulation technique with the coagulation condition that particles stick upon contact. Three dimensional simulations with 500 particles were run to determine the effects of the friction coefficient and the particle concentration on the resulting particle structure and the growth dynamics.

513,267
PB85-141026 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Wideband Frequency-Offset-Locked Dye Laser Spectrometer Using a Schottky Barrier Mixer.
Final rept.,
J. C. Bergquist, and H. U. Daniel. 1 Jan 84, 7p
Sponsored by Air Force Office of Scientific Research, Bolling AFB, DC., and Office of Naval Research, Arlington, VA. Prepared in cooperation with Max-Planck-Inst. fuer Quantenoptik, Garching, (Germany, F.R.).
Pub. in Optics Communications 48, n5 p327-333, 1 Jan 84.

Precise frequency-controlled operation of a single mode ring dye laser with respect to another is reported at a frequency difference of 234 GHz. This extension of the technique of Laser frequency offset locking into the microwave range has been achieved by mixing the two laser lines with the harmonics of a suitable microwave frequency on a Schottky Barrier Mixer. The capability of this spectrometer was demonstrated by a frequency measurement of the transition singlet s (5) to doublet p (8) in (20)Ne with an uncertainty of 10 to the -9th power.

513,268
PB85-141398 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Mechanical and Transport Properties of Drawn Isotactic Polypropylene.
Final rept.,
F. de Candia, A. Perullo, V. Victoria, and A. Peterlin. 1984, 15p
Pub. in Paper in Interrelations between Processing Structure and Properties of Polymeric Materials, p713-727 1984.

Quenched films of isotactic polypropylene were drawn at different temperatures in the range between 25 and 80C. The plastic deformation was quantitatively defined by the true draw ratio lambda (sub loc) of the volume element. Mainly transparent samples were used for the density and transport properties measurement. The observed effects were similar to those obtained formerly with branched and linear polyethylene. The creep deformation before necking is substantially smaller than in polyethylene. In the neck the draw ratio increases by about 6. The axial elastic modulus increases faster than the draw ratio. The drop of the sorption and the zero concentration diffusion coefficient indicate that at the maximum achieved draw ratio the original lamellar structure of the transparent samples is almost completely transformed in the microfibrillar structure.

513,269
PB85-141554 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Carbon Monoxide Compressibility Data from 100 to 300 K; Derived Virial Coefficients, Orthobaric Densities, and Heats of Vaporization.
Final rept.,
R. D. Goodwin. Aug 83, 12p
Pub. in Cryogenics 23, n8 p403-414 Aug 83.

Experimental densities of carbon monoxide are tabulated along experimental pseudoisochores from 90 through 300 K at pressures to 350 bar. Virial coefficient data on isotherms are derived from 120 through 300 K and are formulated vs. temperature by inclusion of data from other sources. Vapor pressures from other sources are formulated and used to derive some orthobaric vapor densities via the virial equation; and orthobaric vapor and liquid densities via isochoric P(rho)T data. All available orthobaric vapor and liquid density data then are formulated and are used to derive and to formulate the heats of vaporization.

513,270
PB85-141851 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Transport Properties as an Extremely Sensitive Indicator of the Status of the Amorphous Component in the Elastically and Plastically Deformed Semicrystalline Polymer.
Final rept.,
A. Peterlin. 1984, 20p
Pub. in Paper in Interrelations between Processing Structure and Properties of Polymeric Materials, p585-604 1984.

As far as the density is concerned the amorphous component in the semicrystalline polymer does not behave like an incompressible rubber although it is above the glass-transition temperature. As a consequence of the uniaxial elastic extensional deformation the specific volume of the amorphous material increases while that of a strained rubber remains constant. The difference between the amorphous phase in a semicrystalline polymer and in an ideal rubber is a consequence of the intimate connection between the amorphous and crystalline phase. As a consequence of the increased specific volume of the amorphous component in the uniaxially strained semicrystalline polymer the enhancement of the transport properties is large and easy to measure, much easier than any other property of the amorphous component. The plastic deformation retains the specific volume and hence, in first approximation, does not modify the transport properties.

513,271
PB85-141919 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.

Spectroscopy of Stored Ions Using Fluorescence Techniques.
Final rept.,
D. J. Wineland, W. M. Itano, J. J. Bollinger, J. C. Bergquist, and H. Hemmati. 1983, 6p
Pub. in SPIE 426, p65-70 1983.

Fluorescence light is used in spectroscopic experiments on stored ions. The authors discuss applications in (1) high resolution microwave and rf/optical double resonance spectroscopy, (2) single ion detection, (3) mass spectroscopy and (4) studies of stored ion clouds which exhibit properties of strongly coupled plasmas.

513,272
PB85-141968 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Laser-Induced Fluorescence Measurement of Nascent Vibrational and Rotational Product State Distributions in the Charge Transfer of Ar(+1) + N2 yields Ar + N2(+1)(v=0.1) at 0.2 eV.
Final rept.,
L. Huwell, D. R. Guyer, G. H. Lin, and S. R. Leone. 15 Oct 84, 16p
Grants NSF-PHY82-00805, NSF-CHE79-11340
Sponsored by Air Force Office of Scientific Research, Bolling AFB, DC.
Pub. in Jnl. of Chemical Physics 81, n8 p3520-3535, 15 Oct 84.

A novel experimental technique couples a flowing afterglow ion source with a supersonic nozzle expansion in order to deliver high densities of relatively low kinetic energy ions into a low pressure chamber. Nascent rotational and vibrational state distributions are obtained by the method of saturated laser-induced fluorescence probing. It is found that a substantial fraction of the available energy is partitioned into internal excitation of the N2(+1) product molecule. It is suggested the experimental findings are best explained in terms of the detailed locations of potential surface crossing seams, rather than by the widely used energy-resonance or diatomic molecule, Franck-Condon ionization models.

513,273
PB85-141992 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
State-Resolved Molecular Reaction Dynamics.
Final rept.,
S. R. Leone. 1984, 27p
Contract DE-AC02-79ER10396, Grant AFOSR-78-3565
Sponsored by Grants NSF-PHY82-00805, NSF-CHE79-11340, and DAA29-82-K-0031.
Pub. in Annual Review of Physical Chemistry 35, p109-135 1984.

The subject of gas phase molecular reaction dynamics is a mature field; but it is one which continues to offer exciting new perspectives on the fundamental nature of chemical transformations. Chemists have in their vocabulary such familiar concepts as 'early' and 'late' reaction barriers, the harpoon mechanism, and 'direct' and 'complex' reaction dynamics. The authors also have a modicum of understanding about which forms of energy, i.e. vibrational, translational, electronic, or rotational, will successfully carry a reaction to completion. Much of this understanding comes from ingenious state-resolved experimental measurements on elementary chemical reactions, coupled with the excellent insight provided by detailed theoretical calculations. Because so much has already been discovered and said about reaction dynamics, it is important to identify significant new developments and results. This review focuses on recent experimental investigations in state-resolved molecular reaction dynamics, involving primarily work carried out from 1980-1983. The trend is toward investigations that involve a higher degree of sophistication to learn about geometrical and orientation effects, bimodal state distributions that result from multiple reaction pathways, resonance effects, and the competition between reactive and inelastic channels. In addition, well-known techniques are being applied to new systems, including investigation of reaction dynamics on catalytic metal surfaces, study of atom-radical reactions and ion-molecule reactions, and determination of product branching in reactions that have a manifold of pathways.

513,274
PB85-142006 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Status of Thermophysical Properties Data for Pure Fluids and Mixtures at Low Temperatures.
Final rept.,
A. J. Kidnay, N. A. Olien, and M. J. Hiza. 1983, 9p
Pub. in AIChE (American Institute of Chemical Engineers) Symposium Series 79, n224 p105-113 1983.

This paper discusses the need for and the availability of both thermodynamic and physical properties data for the fluids generally encountered in low-temperature processing. The important gaps in the existing data are noted and recommendations are made for future experimental programs.

513,275
PB85-142032 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Gruneisen Parameter in Fluids.
Final rept.,
V. Arp, J. M. Persichetti, and C. Guo-bang. Jun 84, 9p
Pub. in Jnl. of Fluids Engineering 106, p193-201 Jun 84.

The Gruneisen parameter has been identified with the thermodynamic properties of lattice structures for some fifty years. In this paper, the authors show that the same thermodynamic variable also occurs prominently in the hydrodynamics of compressible fluids. In the ideal gas region, the Gruneisen parameter is equal to gamma (the specific heat ratio) minus one, and thus is easily overlooked as a separate parameter in its own right. In this paper, they give examples of its appearance and use in hydrodynamics and diatomic gases, heavy hydrocarbons, water, mercury, liquid sodium, and two-phase (liquid-vapor) mixtures.

513,276
PB85-142073 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Direct Measurement of the 3 triplet P(sub 0)-3 triplet P(sub 1) Fine-Structure Interval and the g(sub J)-Factor of Atomic Silicon by Laser Magnetic Resonance.
Final rept.,
M. Inguscio, K. M. Evenson, V. Beltran-Lopez, and E. Ley-Koo. 15 Mar 84, 4p
Pub. in Astrophysical Jnl. 278, pL127-L130, 15 Mar 84.

Laser magnetic resonance measurements have been performed on the ground 3(doublet p)triplet P multiplet of atomic silicon. The J = 0 yields 1 fine-structure interval and the g-factor of the triplet P(sub 1) state have been determined with high precision.

513,277
PB85-142099 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Electrochemical Investigation of N-Methyl-4-(5-Phenyl-2-Oxazolyl)Pyridinium p-Toluenesulfonate: A Laser Dye with Product Deposition.
Final rept.,
R. T. Burke, E. A. Blubaugh, W. T. Yap, and R. A. Durst. 1984, 12p
Pub. in Jnl. of Electroanalytical Chemistry 177, p77-88 1984.

The electrochemical and spectroelectrochemical behavior of N-methyl-4-(5-phenyl-2-oxazolyl)pyridinium p-toluenesulfonate was studied to provide an evaluation of the electrochromic properties of this laser dye. Preliminary cyclic voltammetric experiments provided evidence for the deposition onto the electrode of the product of the electrochemical reduction process. Double potential-step chronocoulometry and spectroelectrochemistry at an optically transparent thin-layer gold-minigrid electrode were used to elucidate the reaction mechanism further. Equations were derived to interpret the spectropotentiostatic Nernst plots which exhibit discontinuities as a result of product precipitation onto the electrode. For redox systems in which there is product deposition, the mathematical treatment described permits the calculation of various thermodynamic and transport properties based on spectropotentiostatic and chronocoulometric data.

513,278
PB85-142123 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Non-Newtonian Phenomena in Simple Fluids.
Final rept.,
D. J. Evans, H. J. M. Hanley, and S. Hess. Jan 84, 8p
Pub. in Physics Today 37, n1 p26-33 Jan 84.

Computer simulation indicates simple liquids can display a surprising range of exotic nonequilibrium phenomena, many of which are associated conventionally with macromolecular systems. Their presence has significant implications for nonequilibrium statistical mechanics and thermodynamics.

513,279
PB85-142560 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Isotope Shifts of C I Spectral Lines and Their Application to Radioactive Dating by Laser-Assisted Mass Spectrometry.
Final rept.,
C. W. Clark. Nov 83, 3p
Pub. in Optics Letters 8, n11 p572-574 Nov 83.

The author has calculated isotope shifts for several one- and two-photon transitions in neutral carbon. The results provide a unified interpretation of existing experimental data, and they demonstrate the applicability of a new method of ultrasensitive isotope trace analysis to carbon.

513,280
PB85-142792 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Handling and Evaluation of Large Networks of Thermochemical Data.
Final rept.,
D. Wagman, D. Garvin, V. Parker, W. Evans, and J. Pedley. 1981, 8p
Pub. in Proceedings of International CODATA Conference, Data Science and Technology, p361-368 1981.

This paper summarizes some recent developments in the automation of the thermochemical evaluation process made in closely related collaborative programs at the U.S. National Bureau of Standards and the University of Sussex in England. The types and contents of both the NBS inorganic compound data banks and the University of Sussex organic compound data banks are described. Emphasis is given to how the machines can assist the data analysts both in making decisions and in disseminating the results of their work. The data banks described have been designed for direct processing. The design provides facilities for search and retrieval, analysis of relationships among measurements, capabilities for evaluations, updating and printing of tables. Validation procedures are described for the data banks of selected thermochemical properties of compounds and for the data banks of the reaction catalogs of thermochemical measurements. The catalogs are the centerpiece for the establishment of 'best values' for the thermochemical properties, delta H, delta G and delta S of chemical processes and of individual substances. At present the catalogs contain only measurements corrected to 298.15K. Automated aids to the analyst in analyzing the catalogs are also described. Some of these are display of measurement networks, loop analysis, least sum and least square solutions and residuals analysis. Tables of thermodynamic properties of compounds can be published directly from the data banks of selected values.

513,281
PB85-142859 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Theory of Charge Exchange and Ionization by Heavy Particles.
Final rept.,
B. H. Bransden. 1983, 24p
Pub. in NATO (North Atlantic Treaty Organization) Advances in Science Instrumentation Series B 101, p245-268 1983.

The theoretical methods employed to calculate charge exchange and ionization in collisions between ions and atoms are surveyed, with particular emphasis on the interaction between fully stripped ions and hydrogen atoms. The range of energies covered is from about 100 eV/amu to about 1 MeV/amu. A bibliography is provided.

513,282
PB85-142891 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.

Measurement of Polymer-Solvent Diffusivity by Inverse Gas-Chromatography.
Final rept.,
G. A. Senich. 1981, 1p
Pub. in Bulletin of the American Phys. Society 26, n3 p429 1981.

The diffusivity of a volatile compound or probe in a polymer can be derived from nonequilibrium inverse gas chromatography (IGC) experiments conducted at rapid carrier gas flow rates. The van Deemter equation is commonly used to relate experimentally measured peak broadening to the probe-polymer diffusion coefficient. This relation, as commonly applied, neglects diffusive processes in the gas phase and variations in the local carrier gas flow velocity, two factors which can have a significant effect on the magnitude of the diffusivity found by IGC studies. Another important parameter is the diffusion path length in the polymer phase. Two extremes in polymer geometry possible within the column are considered, a thin, uniformly distributed covering over the entire surface of the spherical column packing or annulus-like regions collected at the contact points between spheres, each with a different diffusion path length. The influence of these factors on probe-polymer diffusivity determinations is illustrated with results from an experimental IGC study of normal octadecane diffusion in linear polyethylene at 150C.

513,283
PB85-142909 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Optogalvanic Spectroscopy - Application to Combustion Systems.
Final rept.,
P. K. Schenck, and J. W. Hastie. 1981, 7p
See also PB81-199200.
Pub. in Optical Engineering 20, n4 p522-528 Aug 81.

Optogalvanic spectroscopy is a method of obtaining absorption spectra of atomic and molecular species in flames and electrical discharges by measuring voltage and current changes upon laser irradiation. This technique alleviates the problems associated with optically monitoring either small absorptions or weak fluorescence in the presence of strong laser light. Optogalvanic spectroscopy in discharges has been useful in characterizing laser linewidths as well as providing a convenient frequency calibration for tunable dye lasers. In addition, the optogalvanic signals have been used to frequency stabilize both continuous wave dye lasers. Optogalvanic spectroscopy has also been possible on some molecular species which exist only in flame or discharge environments. Analytical flame spectrometry utilizing the optogalvanic effect for trace metal detection shows significant promise for many metallic elements. The optogalvanic effect can also serve as a probe of ionization effects in flames. The ionization cross section as well as ion mobilities may be determined from an analysis of optogalvanic signals. This technique has been extended to include the determination of mobilities of soot precursor molecules in rich hydrocarbon flames. Flow velocities may also be determined in laminar flames by following the residual depletion of neutrals in the flame gas stream.

513,284
PB85-142925 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Preparation, Vapor Pressure and Infrared Spectrum of Methyl Nitrite.
Final rept.,
F. L. Rook. 1982, 2p
Pub. in Jnl. of Chemical and Engineering Data 27, n1 p72-73 1982.

A convenient preparation of ordinary and deuterated methyl nitrite has been described, their high resolution infrared spectra recorded, and the vapor pressure curve of CH3ONO measured in the region 154 < or = T(K) < or = 225: log (sup 10) P(torr) = -1365/T + 8.102.

513,285
PB85-142982 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Asymmetry Patterns of Plasma-Broadened Isolated Lines (Carbon I).
Final rept.,
D. W. Jones, and W. L. Wiese. Nov 84, 7p
Pub. in Physical Review A 30, n5 p2602-2608 Nov 84.

The authors have measured detailed profiles of plasma-broadened neutral-carbon lines, utilizing a wall-stabilized arc source and a specially designed data acquisition and processing system. They analyzed the lines in terms of symmetric Lorentzian profiles in order to isolate the deviations due to asymmetries and found regular patterns of an antisymmetric nature around the line centers. The asymmetry patterns have a common shape with a minimum, maximum, and zero crossing at the same points on a reduced wavelength scale, but they vary widely in their amplitudes. These findings are in excellent qualitative agreement with the quasistatic theory of ion broadening due to the quadratic Stark effect. A comparison and match of experimental and theoretical amplitudes has thus been used to determine the ion broadening parameters of these lines, which are in satisfactory agreement with directly calculated values.

513,286
PB85-143337 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
High Energy Forward Elastic Scattering of Electrons: Born Amplitudes for a Pseudostate Model of Atomic Hydrogen.
Final rept.,
S. Geltman, and R. K. Nesbet. 1984, 7p
Grant NSF-PHY82-00805
Pub. in Physical Review A: General Physics 30, n4, p1636-1642 1984.

Exact second Born elastic scattering amplitudes are computed for a dipole excitation pseudostate model of electron scattering by ground state atomic hydrogen. Calculations at 15, 25, and 35 keV incident energy show a forward peak in the differential elastic cross section. The optical theorem is exactly satisfield by these calculations, and the magnitude of the forward peak is determined primarily by physical values of the atomic static polarizability and oscillator strength. In the energy range considered, the computed peak is smaller by a large factor than the magnitude required to interpret recently observed experimental data in terms of single elastic collisions of electrons with ground state atoms.

513,287
PB85-143501 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Fluorescence and Photofragmentation of Liquid Saturated-Hydrocarbons at Energies above the Photo-Ionization Threshold.
Final rept.,
F. P. Schwarz, D. Smith, S. G. Lias, and P. A. Ausloos. 1981, 9p
Pub. in Jnl. of Chemical Physics 75, n8 p3800-3808 1981.

Fluorescence quantum yields, phi (sub F), are reported for liquid alkanes and cycloalkanes excited below and above the photoionization threshold. The quantum yields of fluorescence obtained in the subionization region are in excellent agreement with those reported by Lipsky and colleagues. In the photoionization region, the emission quantum yield is seen to decrease continuously from 8 to 11.6 eV. Measurements carried out in the presence of an electron scavenger, SF6, show that in the photoionization region, emission occurs both from charge recombination processes and deactivation of the superexcited molecule to the vibrationally relaxed singlet state. The presence of these two populations of fluorescing species above the ionization threshold is manifested in differences in the slopes of plots of phi (sub F) as a function of energy above and below the ionization onset. Photofragmentation being the only non-radiative channel in the case of saturated hydrocarbons, the modes of fragmentation have been examined for selected hydrocarbons, as a function of energy. It is noted that the two main dissociative processes H and H2 elimination, show a continuous variation with photon energy, following the trends in the fluorescence quantum yields at these energies. At the highest energy covered in this study (11.8 eV) H atom detachment from the superexcited molecule predominates over all other processes.

513,288
PB85-143568 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Direct Measurement of Fine Structure in the Ground State of Atomic Carbon by Laser Magnetic Resonance.
Final rept.,
R. J. Saykally, and K. M. Evenson. 1980, 5p
Pub. in Astrophysical Jnl., Letters to the Editor 238, n2 p107-111, 1 Jun 80.

The fine-structure intervals in the ground 2 triplet P multiplet of (12)C(I) have been measured with high accuracy by laser magnetic resonance. These precise measurements have made possible the astronomical detection of far-infrared line emissions from (12)C atoms in several interstellar sources, as reported in another paper in this Journal.

513,289
PB85-143642 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Diode Laser Heterodyne Spectroscopy on the Nu1 Band of Sulfur Dioxide.
Final rept.,
J. P. Sattler, T. L. Worchesky, and W. J. Lafferty. 1981, 8p
Pub. in Jnl. of Molecular Spectroscopy 88, n2 p364-371 Aug 81.

Diode laser heterodyne techniques have been used to obtain the frequencies of 55 IR absorption lines of (32)S (16)O2. From these data and from previous microwave and millimeter wave measurements, new spectroscopic constants for the nu 1 band have been determined. The new constants have been used to predict new optically pumped submillimeter wave emissions.

513,290
PB85-143857 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Melting Temperature of Nickel by a Pulse Heating Technique.
Final rept.,
A. Cezairliyan, and A. P. Miller. 1984, 6p
Pub. in Int. J. Thermophys. 5, n3 p315-320 1984.

The melting temperature of 99.98+% pure nickel was measured by means of a subsecond duration pulse heating technique. The results, based on IPTS-68, yield a value of 1729 K for the melting temperature with an estimated maximum uncertainty of + or - 4 K.

513,291
PB85-143865 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Predicted Wavelengths and Transition Rates for Magnetic Dipole Transitions within 3 doublet s 3p(sup n) Ground Configurations of Ionized Cu to Mo.
Final rept.,
J. Sugar, and V. Kaufman. Apr 84, 6p
Pub. in Jnl. of the Optical Society of America B1, n2 p218-223 Apr 84.

Scaled Hartree-Fock radial integrals for the electrostatic parameter (F(sup2)) and the spin-orbit parameter (Zeta(sub p)) and empirical values for the effective far configuration interaction parameter alpha were used in calculating the energy levels of the 3 doublet S 3p(sup n) configurations of ions of copper through molybdenum in the Al, Si, P, S, and Cl isoelectronic sequences. The scale factors were obtained from the trend of fitted values derived from known energy levels of potassium through nickel and known magnetic-dipole lines from copper to molybdenum. The estimated uncertainty for the transition energies varies from + or - 200/cm for Cu to + or - 1000/cm for Mo. Wave functions generated with the scaled integrals were used to calculate magnetic-dipole transition rates between the calculated energy levels.

513,292
PB85-143873 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Reference Lines for Dye Laser Wavenumber Calibration in the Optogalvanic Spectra of Uranium and Thorium.
Final rept.,
C. Sansonetti, and K. H. Weber. Jun 84, 5p
Pub. in Jnl. of the Optical Society of America B1, n3 p361-365 Jun 84.

The optogalvanic spectra of uranium and thorium observed in commercial hollow-cathode lamps provide convenient lines for dye-laser wave-number calibration. The authors describe a simple procedure by which a single-frequency cw dye laser can be set on such lines with an accuracy of a few parts in 10 to the 8th power. They report wave numbers for 16 U and 16 Th lines distributed over the wavelength range 5750-6920 A. The estimated uncertainty of the measurements is 0.0003/cm for U and 0.0004/cm for Th. The results are compared with previous U and Th measure-

ments and are found to be in good agreement with recently reported emission wave numbers determined by Fourier spectroscopy.

513,293
PB85-143881 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Vibrational Predissociation, Tunneling and Rotational Saturation in the HF and DF Dimers.
Final rept.,
A. S. Pine, W. J. Lafferty, and B. J. Howard. 1 Oct 84, 12p
Pub. in Jnl. of Chemical Physics 81, n7 p2939-2950, 1 Oct 84.

The high-resolution spectra of the intramolecular stretching bands of the HF and DF dimers have been recorded with a tunable difference-frequency laser. These measurements yield considerable information about the dynamics of hydrogen bonding in these complexes. Vibrational predissociation is observed as a non-pressure-dependent excess linewidth for the 'bound-H' stretching band of the HF dimer, but no excess linewidth is observed for the 'free-H' stretching band of the HF dimer or for either band of the DF dimer. An unusually large vibrational dependence to the interconversion tunneling frequency is observed for both species, with about a factor of three reduction from the ground state splitting upon excitation of any of the intramolecular stretches. The K subband origins obtained from the A/B hybird 'free-H' stretching band of the HF dimer exhibit an irregular pattern indicating anomalous centrigugal distortion effects suggestive of rotational saturation of the angular orientation of the hydrogen bond.

513,294
PB85-143899 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Wetting, Multilayer Adsorption, and Interface Phase Transitions.
Final rept.,
M. R. Moldover, and J. W. Schmidt. 1984, 9p
Pub. in Physica 12D, p351-359 1984.

When two fluid phases coexist near their mutual critical point one fluid phase forms a layer which intrudes between the other fluid phase and any third phase that happens to be present. As the two fluid phases are taken away from their critical point a phase transition often occurs such that the intruding layer vanishes. The authors present recent evidence that the transition from the complete wetting (intruding layer) configuration to the incomplete wetting (three-phase contact) configuration is a first-order phase transition. The thickness of the intruding layers has been measured for diverse systems. These data are not fully understood. The intruding layers are extreme examples of multilayer adsorption. Certain theories predict that a 'prewetting' transition from high adsorption to low adsorption is associated with the transition from complete wetting to incomplete wetting. Their search for this transition is inconclusive.

513,295
PB85-143915 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Amino Acid Analysis of Angiotensin I by Proton Nuclear Magnetic Resonance Spectroscopy.
Final rept.,
S. A. Margolis, and B. Coxon. 1984, 6p
Pub. in Analytical Biochemistry 141, p355-360 1984.

The chemical shifts of the isoleucine and histidine protons of angiotensin I were assigned and the chemical shifts of the protons of the other amino acids in this peptide were confirmed at a field strength of 400 MHz. These chemical shift assignments were used to determine the amino acid composition of angiotensin I. These data were then compared to the amino acid composition which was determined by chromatographic analysis of the peptide hydrolysate. The results obtained by the chromatographic method were similar to those obtained by the NMR method. The standard deviations of the results were similar, indicating that these methods are equally precise. The major advantages of the NMR method are that it permits the recovery of the peptide after completion of the analysis and improves the quantitation of amino acids which are either partially destroyed by the hydrolysis procedure or require special derivatization methods for detection and quantitation.

513,296
PB85-143931 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Kinetics Investigation of the Gas-Phase Reactions of Cl(doublet P) and OH(X(sup 2)/pi) with CH3CN: Atmospheric Significance and Evidence for Decreased Reactivity between Strong Electrophiles.
Final rept.,
M. J. Kurylo, and G. L. Knable. 19 Jul 84, 4p
Pub. in Jnl. of Physical Chemistry 88, n15 p3305-3308, 19 Jul 84.

The kinetics of the reactions of Cl(doublet P) and OH(X(sup 2)pi) with acetonitrile (CH3CN) in the gas phase were investigated by the flash photolysis resonance fluorescence technique. The low preexponential factor for the OH reaction as well as the low reactivity of Cl are discussed in terms of coulombic interactions between the attacking free radical and the electrophilic substituent on methane. Changes in reactivity for OH and Cl in the reactant sequence CH3OH, CH3Cl, and CH3CN indicate inadequencies in our current predictive abilities for reaction rate parameters. The atmospheric significance of the present results for acetonitrile is also discussed.

513,297
PB85-143949 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Rydberg Series 5p(sup 6) 6snd in the Autoionizing Continua of Neutral Cesium.
Final rept.,
V. Kaufman, J. Sugar, C. W. Clark, and W. T. Hill. Nov 83, 5p
Pub. in Physical Review A: General Physics 28, n5 p2876-2880 Nov 83.

An absorption spectrum of neutral cesium between the 5p(sup 5)(doublet P3/2)6s and 5p(sup 5)(doublet P1/2)6s thresholds was observed in the range of 650-700 A with the National Bureau of Standards 10.7-m grazing-incidence spectrograph. Rydberg series 5p(sup 5)6sns and 5p(sup 5)6snd approaching both upper threshold states (doublet P(sup 1/2)6s, J = 0,1 were identified on the basis of quantum-defect comparisons and Hartree-Fock term energies. Distinctive nd line shapes are compared with those of neutral xenon.

513,298
PB85-143956 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Ag I-like Array 4d sup 10 5s-4d sup 9 5s5p of I VII through Eu XVII.
Final rept.,
V. Kaufman, and J. Sugar. Mar 84, 3p
Pub. in Jnl. of the Optical Society of America B1, p38-40 Mar 84.

The spectra were produced with a high-voltage spark discharge and photographed with the National Bureau of Standards' 10.7-m grazing-incidence spectrograph. The Ag I-like transition array 4d sup 10 5s-4d sup 9 5s5p was first identified by comparison with the analogous array in the Cu I isoelectronic sequence, then by comparison with a calculated spectrum. The latter was obtained with scaled Hartree-Fock radial energy integrals. The array has been observed most completely in I VII and Xe VIII and, with decreasing strength, to higher sequence members. In Sm XVI and Eu XVII only the strongest line was found. The energy levels and the fitted parameter values for I VII and Xe VIII are given.

513,299
PB85-143972 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Evidence for Molecular Reorientations on a Surface: Coadsorption of CO and Na on Ru(001).
Final rept.,
F. P. Netzer, D. L. Doering, and T. E. Madey. 1984, 8p
Pub. in Surface Science 143, pL363-L370 1984.

Evidence is presented for a local interaction between CO and Na adsorbed on Ru(001). For low coverages of Na (theta (sub Na) < or about 0.15 ML) and saturation coverages of CO at 80 K, a fraction of the CO molecules undergo a substantial change in bonding configuration: molecular CO bound perpendicular to the Ru(001) surface changes to an 'inclined' configuration in the presence of low coverages of Na.

513,300
PB85-143980 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Influence of the Image Interaction on Ion Desorption Processes.
Final rept.,
Z. Miskovic, J. Vukanic, and T. E. Madey. 1984, 16p
Pub. in Surface Science 141, p285-300 1984.

A classical treatment of the interaction between an ion and a conducting surface during an ion desorption process is presented. Analytical expressions have been obtained for the trajectories of desorbing ions as well as for the trajectories of ions trapped by the image potential. The distortion by the image potential of a general form of the energy and angular distribution of desorbing ions is estimated. The authors' objective has been to provide a guide for experimentalists to the surprisingly large changes in such distributions caused by the image forces.

513,301
PB85-144004 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Threshold Photoelectron-Photoion Coincidence Spectrometric Study of Dimethylether (CH3OCH3).
Final rept.,
J. J. Butler, D. M. P. Holland, A. C. Parr, and R. Stockbauer. 1984, 15p
Pub. in International Jnl. of Mass Spectrometry and Ion Physics 58, p1-14 1984.

The technique of threshold photoelectron-photoion coincidence spectroscopy has been used to study the dissociation of state-selected dimethylether (CH3OCH3) cations. The crossover region (10.5-11.5 eV) of the breakdown curve for the lowest energy dissociation (CH3OCH3(+1) yields CH3OCH2(+1) + H has been recorded using threshold photoelectron-photoion coincidence with variable ion residence time.

513,302
PB85-144384 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Low Temperature Plasma-Enhanced Epitaxy of GaAs.
Final rept.,
K. P. Pande, and A. C. Seabaugh. Jun 84, 3p
Pub. in Jnl. of the Electrochemical Society 131, n6 p1357-1359 Jun 84.

Low-temperature (<450C) deposition of single crystal GaAs using a new plasma-enhanced MO-CVD technique is reported. In this technique, plasma is created by a dc potential and the substrate is not directly exposed to the plasma. Deposition of GaAs was achieved at extremely low plasma power (<5 W) using trimethylgallium (TMGa) and arsine (or trimethylarsenic) reactants. The resulting epitaxial films show excellent surface morphology and thickness uniformity over a large area substrate. Measurements on Schottky barrier devices fabricated on n/n+ layers show uniform impurity doping profiles. Temperature dependence of the diode capacitance indicates a density of deep trapping centers as low as 6.2 x 10 to the 13th power/cc.

513,303
PB85-144459 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Adsorption of Polystyrene on Thermally Oxidized Silicon.
Final rept.,
J. A. Hinkley. Apr 84, 2p
Pub. in Polymer Preprints, American Chemical Society, Division of Polymer Chemistry 25, n1 p178-179 Apr 84.

Ellipsometry was used to observe the adsorption, from theta solvents, of polystyrene on thermally oxidized silicon. Since no adsorption was seen with a polar solvent, it is concluded that specific acid-base interactions are decisive in adsorption. At high surface coverages, the present results agree with those on various metal surfaces, and the root mean square extension of polymer coils from the surface is almost twice the radius of gyration of a chain in solution.

513,304
PB85-144863 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.

Flexibility of the Framework of Zeolite Rho. Structure Variation from 11 to 573 K. A Study Using Neutron Powder Diffraction Data.
Final rept.,
J. B. Parise, L. Abrams, T. E. Gier, D. R. Corbin, and J. D. Jorgensen. 1984, 5p
Pub. in Jnl. of Physical Chemistry 88, p2303-2307 1984.

The structure of the dehydrated and deuterium-exchanged form of deammoniated zeolite Rho (Cs1.15(SiAl)48O96D) has been studied at 11, 295, 423, and 573 K. All data sets were refined by using the Rietveld refinement technique in the noncentrosymmetric spece group I43m and are characterized by the presence of elliptically distorted double 8-rings. In agreement with a previous study of the effects of hydration upon the framework, increase in temperature causes a monotonic increase in the cubic-unit-cell parameter (a sup 0) and a corresponding decrease in delta, the parameter describing the 'degree of ellipticity' as measured by the difference between the major and minor axes of the 8-ring ellipses. The variations of both delta and a sup 0 with temperature in the range 11 < T < 573 K appear to fall close to smooth curves. Extrapolation of these curves suggests that the structure may be centrosymmetric above 800 K. This prediction is supported by a study of the changes in the X-ray diffraction pattern of deammoniated Rho up to 773 K.

513,305
PB85-144871 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Refinement of the Structure of Trilanthanum Trichlorohexaoxotungstate, La3WO6Cl3, from Neutron Powder Diffraction Data.
Final rept.,
J. B. Parise, L. H. Brixner, and E. Prince. 1983, 3p
Pub. in Acta Crystallographica C39, p1326-1328 1983.

M(sup r) = 802.9, P6(sup 3)/m, a = 9.4092(2), c = 5.4276(2) A, V = 416.15(2) Cu A, Z = 2, high-resolution neutron powder diffraction data (lambda = 1.5416(3) A, T = 295K), collected from 10 to 122 degrees in 2 theta with 0.05 step size; final weighted profile R = 9.6% was compared to an expected R(sup E) = 7.41% (conventional R based on integrated intensities = 6.00%). The refinement confirms the unusual trigonal prismatic coordination found for the WO6 group in the X-ray study (Brixner, Chen & Foris (1982). J. Solid State Chem. 44, 99-107). The W-O and La-Cl bond lengths determined in this study are slightly shorter, by 0.006 (2)-0.014(4) A, than those found in the X-ray determination.

513,306
PB85-144889 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Electron Emission and Ion Desorption Spectroscopy of Clean and Oxidized Ti(0001).
Final rept.,
E. Bertel, R. Stockbauer, and T. E. Madey. 1984, 33p
See also AD-A141 319.
Pub. in Surface Science 141, p355-387 1984.

The electronic structure of Ti(0001) has been investigated using energy loss spectroscopy (ELS), Auger electron spectroscopy (AES), UPS (ultraviolet photoemission spectroscopy) and electron stimulated desorption (ESD). Resonant electron emission due to a direct recombination process involving an atomic 3p - 3d interaction has been observed. Surface oxidation results in the formation of a thin protective TiO2 layer which is stable to 250C. In the oxide, the direct recombination process following 3p excitation gives rise to resonantly enhanced emission from the oxide valence band. The cross section for electron stimulated O(+) desorption is shown to be dominated by these atomic resonance effects as well.

513,307
PB85-144897 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Production Rates for Discharge Generated SOF2, SO2F2, and SO2 in SF6 and SF6/H2O Mixtures.
Final rept.,
R. J. Van Brunt, W. E. Anderson, and T. C. Lazo. 1984, 10p
Sponsored by Department of Energy, Washington, DC. Div. of Electric Energy Systems.
Pub. in Proceedings of International Symposium on Gaseous Dielectrics (4th), Knoxville, TN., April 29-May 3, 1984, p276-285.

Production rates for SOF2, SO2F2, and SO2 have been measured by quantitive gas analysis during continuous corona discharges in compressed SF6 containing trace levels (10 to 200 ppm) of water vapor for total gas pressures between 100 and 300 kPa. The rates are expressed both in terms of moles-per-unit of energy dissipated in the discharge, and in moles-per-unit of charge transported in the gap. Variations in the absolute and relative concentrations of H2O and SOF4 respectively were also monitored. Determinations were made of the polarity, power, and pressure dependences of these rates. The time rates-of-production for SOf2 and SO2F2 are more nearly proportional to the discharge current than to the power dissipation. The results indicate that the equilibrium concentration of H2O is significantly affected by the discharge. The influence of O2 and H2O on oxyfluoride production is discussed.

513,308
PB85-145191 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Aqueous Solubility and Octanol/Water Partition Coefficient of Organic Compounds at 25.0 C.
Final rept.,
Y. B. Tewari, M. M. Miller, S. P. Wasik, and D. E. Martire. 1982, 4p
Pub. in Jnl. of Chemical and Engineering Data 27, n4 p451-454 1982.

Aqueous solubilities (C(sub s)(sup w)) and octanol/water partition coefficients (K(sub o/w)) of 62 organic solutes, falling into 7 general chemical classes, have been systematically determined using the modified generator column method. From thermodynamics an equation is derived relating K(sub o/w) to the volume-fraction-based solute activity coefficient in water (gamma(sub s)(sup w)), the latter being determinable from C(sub s). For each class of compounds, excellent linear correlations are found between log C(sub o/w) and log gamma (sub s)(sup w), with slopes close to the theoretical value of unity.

513,309
PB85-145290 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Distribution of Straight-Chain Lengths in Unannealed and Annealed Solution-Crystallized Polyethylene by Raman Spectroscopy.
Final rept.,
R. G. Snyder, J. R. Scherer, D. H. Reneker, and J. P. Colson. 1982, 9p
Pub. in Polymer 23, n9 p1286-1294 Aug 82.

The effect of annealing on the morphology of solution-crystallized polyethylene had been studied by analyzing the shape of the low-frequency Raman LAM-1 band. The distributions of lengths of straight-chain segments have been determined for samples annealed at different temperatures. Unannealed samples, which have distribution peaks L(max) near 100 A, have halfwidths delta L(sub 1/2) less than 20 A. However, this narrow distribution is drastically broadened when the sample is annealed. The broadening is less if the breadth of the distribution of the unannealed sample is initially less. For equilibrium crystallized samples, the observed halfwidth and peak position of LAM-1 are related. This relation can be understood quantitatively if it is assumed that delta L(sub 1/2) and 1/L(sub max) are linearly related as is indeed found to be the case for solution-crystallized samples. As L(max) becomes very large, delta L(sub 1/2) approaches a limiting value near 300 A.

513,310
PB85-145308 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
NBS (National Bureau of Standards): Current Work and Future Plans in Reference Materials.
Final rept.,
S. D. Rasberry. 1982, 3p
Pub. in Analytical Proceedings 19, n1 p5-7 1982.

This paper is an extended abstract (1,000-word summary) of a talk presented to the Royal Society of Chemistry in London on 4 February 1981. It describes the status of the NBS program in Standard Reference Materials and indicates the directions planned for the program over the next five years.

513,311
PB85-145373 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.

Aqueous Solubilities and Octanol-Water Partition-Coefficients of Binary-Liquid Mixtures of Organic-Compounds at 25 C.
Final rept.,
Y. B. Tewari, D. E. Martire, S. P. Wasik, and M. M. Miller. 1982, 11p
Pub. in Jnl. of Solution Chemistry 11, n6 p435-445 1982.

From thermodynamics it is shown that, under the usual experimental conditions, the octanol-water partition coefficient (K(sup o/w)) of a given organic liquid should be the same whether the substance is partitioned by itself or as part of a mixture.

513,312
PB85-145399 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Corrosion Phenomena for Iron Covered with a Cellulose Nitrate Coating.
Final rept.,
J. J. Ritter, and M. J. Rodriguez. 1982, 4p
Pub. in Corrosion 38, n4 p223-226 Apr 82.

The corrosion of metals protected by organic coatings is an incompletely understood phenomenon. Recent investigations by an in situ ellipsometric-electrochemical technique combined with microanalytical studies have provided new insights into the destructive processes. Events such as the roughening of the metal surface, chloride ion accumulation and the thickening of the surface oxide have been detected under the coating and are interpreted in terms of the chemistry which develops between the microenvironment and the substrate.

513,313
PB85-145431 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Stochastic Defect Diffusion Model for Relaxation Effects in Crystalline Polyethylene.
Final rept.,
D. H. Reneker, and J. Mazur. 1982, 12p
Pub. in Polymer 23, n3 p401-412 Mar 82.

It is suggested that some relaxation processes observed in crystalline polyethylene are consequences of the diffusive motion of a particular defect called a point dislocation or twist dispiration loop along the polyethylene stems in lamellar crystals. The motion of the defect, characterized by a diffusion coefficient and a mobility, is described by solutions of the Smoluchowski diffusion equation with boundary conditions that constrain the defect to move along routes that produce experimentally observable results. The fact that passage of the defect causes both a 180 rotation of the chain and moves an extra CH2 group in the direction of the chain axis is important to the interpretation of the data according to this model. The diffusion coefficient for a defect is estimated to be around 5 x 10 to the -9th power sq cm/s. This value is shown to be reasonable both from the viewpoint of detailed computer modeling of defect motion and contemporary ideas about scaling.

513,314
PB85-145464 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Total and Partial Electron Collisional Ionization Cross Sections for CH4, C2H6, SiH4 and Si2H6.
Final rept.,
H. Chatham, D. Hils, R. Robertson, and A. Gallagher. Aug 84, 8p
Sponsored by Solar Energy Research Inst., Golden, CO.
Pub. in Jnl. of Chemical Physics 81, n4 p1770-1777 Aug 84.

The total and partial electron collisional ionization cross sections for CH4, C2H6, SiH4 and Si2H6 have been measured for electron energies from threshold to 300 eV. Comparisons are made to earlier measurements.

513,315
PB85-145480 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Shear Viscosity Coefficients of Nitrogen + Methane and Methane + Ethane Mixtures.
Final rept.,
D. E. Diller. Nov 83, 5p
Pub. in American Society of Mechanical Engineers Paper No. 83-WA/HT-49, 5p Nov 83.

The shear viscosity coefficients of compressed gaseous and liquid nitrogen + methane and methane + ethane mixtures have been measured with a torsional crystal viscometer at three fixed compositions (each) and throughout a large range of temperatures (100-300 K), pressures (0.5-30 MPa) and densities (0.1-3 pc). This PVT range includes states near liquid-vapor equilibrium, states near liquid-solid equilibrium and states near the critical region. The measured dependences of the viscosities on density, temperature and composition are compared with an extended corresponding states model.

513,316
PB85-145506 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Calculations for Separations with Three Phases. 2. Continuous Contact Systems.
Final rept.,
P. C. Wankat, and R. D. Noble. 1984, 7p
Pub. in Industrial and Engineering Chemistry Fundamentals 23, n2 p137-143 1984.

General graphical solution methods for continuous contact separations with two cocurrent streams flowing countercurrent to the third stream are developed. Applications include liquid membrane separations, slurry adsorption, three-phase extraction, and steam distillation. For two phases in equilibrium, and methods are simplified. For nonlinear equilibria two graphical techniques are developed. One method uses variable operating lines while the other method develops a pseudo-equilibrium curve. The analysis shows that the evaluation of NTU is independent of a series or parallel separation when two phases are in equilibrium. HTU does depend on the separation path.

513,317
PB85-145548 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Effect of Vibration-Rotation Interaction on the Quadrupole Hyperfine Structure of Molecular Rotational Levels.
Final rept.,
M. R. Aliev, and J. T. Hougen. 1984, 14p
Pub. in Jnl. of Molecular Spectroscopy 106, p110-123 1984.

By using a contact transformation method similar to that commonly emploYed when determining higher-order corrections to the harmonic oscillator and rigid rotor energy levels of molecules, analogous centrifugal distortion and anharmonic corrections to the nuclear quadrupole coupling energies have been obtained for molecules containing one quadrupolar nucleus. The J, K dependence and v, I dependence of these higher-order corrections to the quadrupole hyperfine energies can be cast in a form which is remarkably similar to the form taken for ordinary vibrational and rotational energy corrections, a result which was not evident from earlier partial treatments of this general problem. Results are obtained here for asymmetric top, symmetric top, spherical top, and linear molecules.

513,318
PB85-145589 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Absolute Frequency Measurements of the 00(sup 0)2-00(sup 0)0, 20(sup 0)1-00(sup 0)0, and 12(sup 0)1-00(sup 0)0 Bands of N2O by Heterodyne Spectroscopy.
Final rept.,
C. R. Pollock, F. R. Petersen, D. A. Jennings, J. S. Wells, and A. G. Maki. 1984, 10p
Pub. in Jnl. of Molecular Spectroscopy 107, p62-71 1984.

The absolute frequency of 39 lines in the 00(sup 0)2-00(sup 0)0, 20(sup 0)1-00(sup 0)0, and 12(sup 0)1-00(sup 0)0 band of N2O in the 4300 - 4800/cm range have been measured through heterodyne frequency measurements. The lines were each measured in Doppler-limited absorption using a color center laser as a tunable probe of the N2O, and two stabilized CO2 lasers as reference frequencies. New ro-vibrational constants have been fitted to these measurements. Tables of calculated transition frequencies are given with estimated absolute uncertainties as small as .0001/cm. The pressure shift of four lines has been measured and the values fall within the range of 0 to -2 kHz/Pa (0 to -200 kHz/Torr).

513,319
PB85-145605 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Electrochemical Studies on Doping of Polyacetylene.
Final rept.,
C. K. Chiang, E. A. Blubaugh, and W. T. Yap. Aug 84, 5p
Pub. in Polymer 25, p1112-1116 Aug 84.

The mechanism for electrochemical doping of polyacetylene was studied using cyclic voltammetry. The I-V curve of a thin (CH)x film (<1 micrometer) electrode exhibited a redox peak with a formal redox potential of +0.63 V vs sodium SCE. Approximately 30% of the total charge that oxidized (CH)x was not reversible when held at the open circuit voltage of the cell. A more negative potential was needed to recover the remaining charge. This large charge-trapping phenomenon was the consequence of the (CH)x film being doped. Using a thick film electrode or freestanding film (about 0.1 mm) as an electrode, the I-V curve gave only a broad reduction peak at +0.4 V. The disappearance of the well-defined redox peak implies that the redox process revealed by the thin film data may not be the primary mechanism for the doping process.

513,320
PB85-145613 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Effective Potentials in Molecular Quantum Chemistry.
Final rept.,
M. Krauss, and W. J. Stevens. 1984, 29p
Pub. in Annual Review of Physical Chemistry 35, p357-385 1984.

Model potentials and effective core potentials are impacting quantum chemistry by allowing accurate structure calculations to be performed for very large systems such as solid state systems, complex organic and biomolecules, and polymers. Relativistic effective potentials have allowed, for the first time, systematic theoretical exploration of heavy atom chemistry. The most appealing aspect of these effective potential methods is that they are ab initio, and, therefore, like the all-electron methods they simulate, extensible to all atomic and molecular systems. The theoretical framework that underlies the determination of effective potentials is intuitively sound, but sometimes less than rigorous. This is especially true for the relativistic extensions which need to be examined much more carefully since direct comparisons with more rigorous all-electron results are difficult.

513,321
PB85-145621 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Collision Dynamics of Three Interacting Atoms: Model Calculations of H + H2 Resonances.
Final rept.,
A. C. Kuruoglu, and D. A. Micha. May 84, 15p
Pub. in Jnl. of Chemical Physics 80, n9 p4262-4276 May 84.

Collisions of H and H2 at thermal energies are studied within a three-body theory of atom-diatom rearrangement collisions. A previously developed general formalism based on a diabatic electronic representation is shown to be equivalent, for this system, to a treatment in terms of atomic spins. It further provides a novel approach to nuclear exchange symmetry. The interaction potential is parametrized by introducing a minimal valence-bond basis, and the collision dynamics is described with the Faddeev equations. These equations are reduced to two-body form, and are analyzed in terms of angular momentum components. A detailed description is given of the numerical procedure applied to the coupled integral equations that result from expanding in diatomic square integrable basis functions. Those equations are solved in momentum variables using quadrature techniques, and provide K-matrix elements.

513,322
PB85-147908 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Picosecond Vibrational Energy Relaxation of Surface Hydroxyl Groups on Colloidal Silica.
Final rept.,
E. J. Heilweil, M. P. Casassa, R. R. Cavanagh, and J. C. Stephenson. 15 Sep 84, 3p
Pub. in Jnl. of Chemical Physics 81, n6 p2856-2858, 15 Sep 84.

The authors report the first time-resolved measurement of vibrational energy relaxation (T1) for a chemisorbed species. A picosecond infrared saturation and ground state recovery technique measured population decay of vibrationally excited hydroxyl groups bound to room temperature colloidal SiO2 dispersed in CCl4. The ground electronic state vibrational decay times correspond to twenty thousand vibrational periods.

513,323
PB85-148021 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Priority Toxic Pollutants in Human Urine: Their Occurrence and Analysis.
Final rept.,
A. J. Fatiadi. 1984, 31p
See also PB83-225888.
Pub. in Environment International 10, p175-205 1984.

This survey reviews and discusses the occurrence of priority pesticides and industrial chemicals in human urine. An overview of some recent analytical methodology for determination of selected toxic pollutants and their metabolites as they are found in human urine is also presented.

513,324
PB85-148039 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Development of Reference Materials for Acid Rain Research.
Final rept.,
W. F. Koch, G. Marinenko, and Y. C. Wu. 1984, 5p
Pub. in Environment International 10, p117-121 1984.

The Center for Analytical Chemistry of the National Bureau of Standards is actively engaged in research to provide the basis for quality assurance in chemical measurements of rain water. Several types of SRM's are currently available which have direct applicability to atmospheric deposition programs. In addition, research is proceeding to develop an SRM specifically for rain-water analyses. Initial attempts, using a single solution containing all the components of rain and stored in glass ampoules, were unsuccessful due to the chemical instability of the solution. Current efforts are directed to improving the stability by using polyethylene bottles to store the solutions, and by preparing two separate solutions, one for the major components of rain (sulfate, nitrate, chloride, sodium, potassium, calcium, magnesium, ammonium, and hydrogen ions), and the other for the trace metals. Preliminary results on the stability of a pilot set of simulated rainwater solutions are encouraging.

513,325
PB85-148062 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Vibrational Energy Disposal in Reactive and Inelastic Collisions of H(D) + HCl(DCl) at 1 to 3 eV.
Final rept.,
C. A. Wight, F. Magnotta, and S. R. Leone. 1 Nov 84, 7p
Contract DAAG29-82-K-0031, Grant NSF-PHY82-00805
Sponsored by Grant NSF-CHE79-11340.
Pub. in Jnl. of Chemical Physics 81, n9 p3951-3957, 1 Nov 84.

Vibrational energy disposal due to reactive exchange and unreactive translational-to-vibrational excitation in hyperthermal collisions of H + HCl and deuterated analogues is investigated by the excimer laser photolysis/ infrared fluorescence technique. This is consistent with an interpretation that the inelastic T-V excitation pathway is predominant. No information is obtained on the H atom abstraction channel.

513,326
PB85-148070 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Pilot Environmental Specimen Bank Program.
Final rept.,
S. A. Wise, and R. Zeisler. Oct 84, 6p
Pub. in Environmental Science and Technology 18, n10 p302A-307A 1984.

Since 1980, the National Bureau of Standards has been involved in a pilot study to evaluate the feasibility of long-term environmental specimen banking as an important part of environmental monitoring. Human liver was selected as the first environmental sample type for the pilot program. Sampling, homogenization, and storage procedures, which were designed to avoid contamination of either trace inorganic or trace organic constituents, were developed and implemented. Ana-

lytical results are discussed for the determination of trace elements and organochlorine pesticide residues in samples collected during the first three years of this program.

513,327
PB85-148068 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Dependence of the Phase Diagram on the Coupling Parameters in Water-Lattice Models.
Final rept.,
E. Van Royen, and P. H. E. Meijer. 1984, 26p
Pub. in Physica 127A, p87-112 1984.

This paper reports specific results obtained with the two previously proposed lattice models of water as based on the cluster variation method. The hydrogen-bonded lattice gas with next nearest neighbor repulsion has a Hamiltonian with three coupling parameters. The authors map out the region in the coupling parameter space which gives a phase diagram that has the same topology as the phase diagram of water. They first discuss, using the simple model, how one diagram evolves into a seemingly different topology and explain how the first order terminal points disappear in the metastable region. They then use the extended model, which contains two extra degrees of freedom to describe four phase diagrams that show some of the desired features the authors want in a water potential. The final choice is made, using a potential labelled 9, which shows all desired features in a qualitative way. A discussion is given about the limitations of the model.

513,328
PB85-148104 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Transient Heat Transfer Processes.
Final rept.,
V. D. Arp, D. E. Daney, P. J. Giarratano, and W. G. Steward. 1983, 7p
Pub. in AIChe (American Institute of Chemical Engineers) Symposium Series 79, n224 p126-132 1983.

An integrated experimental and modeling study of transient heat transfer to a compressible fluid involving rapid convective motion normal to the heated surface, perturbations due to superimposed motion parallel to the surface, and modeling of these effects will be summarized. Analyses done for both one and two-dimensional thermally-induced convective motions and deviations from incompressible fluid theory documented in one dimension will be discussed. Mathematical stability problems associated with the form of the fluid equation of state also will be discussed.

513,329
PB85-148112 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Nonlinear Flow Behavior of Gases.
Final rept.,
S. Hess, H. J. M. Hanley, and N. Herdegen. 15 Oct 84, 3p
Sponsored by Department of Energy, Washington, DC. Office of Basic Energy Sciences.
Pub. in Physical Letters 105A, n4-5 p238-240, 15 Oct 84.

Computer simulation results for a dilute Lennard-Jones gas subjected to a shear are compared with theoretical predictions from an approximate solution of the Boltzmann equation. Nonlinear, non-newtonian characteristics are observed in the gas, including the existence of normal pressure differences. Agreement between the simulations and kinetic theory is satisfactory.

513,330
PB85-148146 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Surface Chemistry of Bone and Tooth Mineral.
Final rept.,
D. N. Misra. 1984, 31p
Sponsored by American Dental Association Health Foundation, Chicago, IL.
Pub. in Methods of Calcified Tissue Preparation, Chapter 13, p435-465 1984.

This article will constitute a chapter of a book 'Calcified Tissue Preparation', edited by Dr. Glenn R. Dickson of The Queens University of Belfast and will be published by Elsevier/North Holland. The chapter reviews the surface chemistry of hydroxyapatite, the structural prototype of bone mineral, from the viewpoints of adsorption, chemical and crystal structure, electrochemistry, isoionic exchange, and solubility.

513,331
PB85-148476/GAR PC A06/MF A01
Dow Corning Corp., Midland, MI.
Investigation of Structure-Permeability Relationships of Silicone Polymer Membranes.
Annual rept. Oct 83-Sep 84,
C. L. Lee, S. A. Stern, and J. E. Mark. Oct 84, 124p GRI-84/0210
Contract GRI-5082-260-0666
See also PB84-160977. Prepared in cooperation with Syracuse Univ., NY. Dept. of Chemical Engineering, and Cincinnati Univ., OH. Dept. of Chemistry.

Synthesis of polymers at Dow Corning were almost completed except the (phi PrSiO)x. Most of the determination of physical properties such as density, compressibility, Tg, expansion coefficient, cohesive density and X-ray diffraction were also completed. Preliminary economic evaluation of oxygen enrichment of air has been carried out and iso-cost curves as a function of gas permeability and gas selectivity have been obtained. Gas permeability data obtained at Syracuse University indicates that an increase in the size of the side-group of silicone polymer chains causes a decrease in the gas permeability with a concomitant increase in gas selectivity. However, if the side-groups have a special affinity toward specific penetrant molecules, the polymers could exhibit both high permeability and gas-selectivity. An attempt has been made to interpret experimental data in terms of the molecular model. Chain-bending modulus and mean jumping distance have been calculated for (MeRSiO)x, where R = Me, Pr and F3Pr.

513,332
PB85-148492 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
NBS (National Bureau of Standards) Standard Reference Materials for Food Analysis.
Final rept.,
R. Alvarez. 1984, 15p
Pub. in Modern Methods of Food Analysis, Chapter 5, p85-99 1984.

The National Bureau of Standards is responsible under Federal statute for issuing Standard Reference Materials (SRM's) to assist investigators improve the accuracy of their laboratory tests. For the food science laboratory, these well-characterized, certified materials are available to serve as accuracy-control materials; to prepare primary standard solutions; and to evaluate and monitor the performance of instruments and devices, such as polarimeters and spectrophotometers. Of the approximately 900 different SRM's listed in the current catalog, the biological matrix materials are especially suitable for long-term quality assurance of food analyses. Examples of these are: Oyster Tissue (SRM 1566), Bovine Liver (SRM 1577a), Wheat Flour (SRM 1577), Rice Flour (SRM 1568), and a Non-Fat Milk Powder (Proposed SRM 1549), expected to be issued in late 1983. The Certificate of Analysis for these SRM's include certified concentrations of nutritionally and toxicologically important elements. Other SRM's for food and beverage analysis include a stabilized wine and compounds of certified high purity, such as cholesterol. Additional SRM's have been developed for metabolic studies, such as Human Serum (SRM 909).

513,333
PB85-149789/GAR PC A02/MF A01
Yale Univ., New Haven, CT.
In situ Monitoring of Electrochemical Reactions by Surface Enhanced Raman Scattering.
Annual rept. 1 Jul 83-30 Jun 84,
R. K. Chang, and V. E. Henrich. Jul 84, 21p GRI-84/0172
Contract GRI-5083-260-0795
See also PB83-161430.

Surface enhanced Raman scattering (SERS) was applied in studying interfacial H2O, D2O, OH(-1), OD(-1), and the protonation of PO4(-3) and Ag2O. The effects of the anions (Cl(-1), Br(-1), I(-1), SCN(-1), OCN(-1), and CN(-1), of the cations (Cs(+1), Rb(+1), K(+1), Na(+1), Li(+1), Ba(+2), Sr(+2), Ca(+2), Mg(+2)), and of complexing molecules (pyridine) were investigated. The lineshapes of the SERS spectra for interfacial water and heavy water revealed sensitivity to the anions and cations and were explained in terms of the adsorption configuration of specific water molecules on the Ag electrode surface. We have designed an optical multichannel detection system by which the spectral range from + or - 250/cm through 0/cm can be simultaneously detected. To date, the 0 - 50/cm Raman shift has not been readily accessible to SERS investigators. We are presently investigating the low frequency peak and continuum which have been reported by other groups to pertain to Brillouin scattering from individual microstructures and adatom induced inelastic scattering. The author also pursued a new technique to fabricate individual metallic spheres and spheroids on an insulating substrate and with specific edge-to-edge separation. These Ag, Au, and Ni microstructures with sizes in the 200 nm range will be fabricated at the National Research and Resources Facility for Submicron Structures at Cornell University. Electromagnetic calculations on the enhancement factor for these microstructures can be as large as 100.

513,334
PB85-854362/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Chromatography for Pollution and Toxicological Analysis. June 1970-January 1984 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jan 84.
Jan 85, 231p

This bibliography contains citations concerning the use of chromatography in the analysis of air and water pollutants, wastes, and toxic materials. Gas chromatography and high performance liquid chromatography are emphasized in this bibliography. Applications and performance evaluations of chromatographic adsorption processes are included. (This updated bibliography contains 329 citations, none of which are new entries to the previous edition.)

513,335
PB85-854370/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Chromatography for Pollution and Toxicological Analysis. February 1984-January 1985 (Citations from the Engineering Index Data Base).
Rept. for Feb 84-Jan 85.
Jan 85, 56p
Supersedes PB84-858232.

This bibliography contains citations concerning the use of chromatography in the analysis of air and water pollutants, wastes, and toxic materials. Gas chromatography and high performance liquid chromatography are emphasized in this bibliography. Applications and performance evaluations of chromatographic adsorption processes are included. (This updated bibliography contains 62 citations, all of which are new entries to the previous edition.)

513,336
PB85-854503/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Chemical Analysis Techniques of Trace Elements. June 1981-January 1984 (Citations from the NTIS Data Base).
Rept. for Jun 81-Jan 84.
Jan 85, 267p

This bibliography contains citations concerning techniques and equipment used in the analysis of trace elements and various compounds occurring in trace amounts. Polarography, spectroscopy, gas chromatography, ion exchanging, separation, extraction, distillation, x-ray fluorescence analysis, and neutron activation analysis are among the methods discussed. Considerable attention is given to pollution detection methods. (This updated bibliography contains 286 citations, none of which are new entries to the previous edition.)

513,337
PB85-854511/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Chemical Analysis Techniques of Trace Elements. February 1984-January 1985 (Citations from the NTIS Data Base).
Rept. for Feb 84-Jan 85.
Jan 85, 75p
Supersedes PB84-858489.

This bibliography contains citations concerning methods and equipment used in the chemical analysis of trace elements and compounds occurring in trace amounts. Electron microscopy, neutron activation

analysis, spectroscopic techniques, diffraction, and fluorescence are among the analytical methods considered. Biological tissue, and air, soil, and water pollutants are discussed. (This updated bibliography contains 69 citations, all of which are new entries to the previous edition.)

513,338
PB85-854560/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Membrane Gas Separation. 1970-January 1985 (Citations from the NTIS Data Base).
Rept. for 1970-Jan 85.
Jan 85, 147p
Supersedes PB84-857499.

This bibliography contains citations concerning the research and development of gas separation and purification utilizing plastic and metal membranes. Among the topics included are isotope separation, osmotic techniques, reverse osmosis, and preparation of membranes for specific separation processes. The permeability of polymer membranes is discussed in terms of physical properties as well as molecular structure. The selectivity of polymeric films for a variety of gases is also included. (This updated bibliography contains 152 citations, 11 of which are new entries to the previous edition.)

7E. Radio and Radiation Chemistry

513,339
DE85002824/GAR PC **A02**/MF **A01**
Du Font de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Robotics in the Radiochemical Laboratory.
J. E. Young, S. D. Burkett, and W. A. Spencer. 1984, 10p DP-MS-84-72, CONF-841023-3
Contract AC09-76SR00001
27. ORNL-DOE conference on analytical chemistry in energy technology, Knoxville, TN, USA, 2 Oct 1984.

Robotics technology provides tools for improved productivity and safety in the radiochemical laboratory. Several high volume analyses at the Savannah River Laboratory (SRL) have been targeted for the application of robotics. Some examples include the preparation of vials containing sample reagents, radioactive sample preparation, and quality control standard preparations. At SRL the Zymark components are used with devices which have been fabricated for our specific needs. These custom devices are described. (ERA citation 10:002953)

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

513,340
DE85001684/GAR PC **A02**/MF **A01**
Washington Univ., Seattle. Dept. of Oceanography.
Hydrocarbon Studies in Puget Sound and off the Washington Coast. Report of Progress, March 1980-February 1981.
R. Carpenter. Feb 81, 15p DOE/EV/70040-T3
Contract AT06-76EV70040
Portions are illegible in microfiche products.

This report summarizes the past year's progress in studies of the amounts, types and probable origins of aliphatic, aromatic, S- and N-containing hydrocarbons in sediments, organisms and waters of Puget Sound and the Washington coast. We are identifying the relative importance of the various possible sources of these substances, the major pathways by which they are transferred through some parts of the marine food web, their rates of transfer, their possible transformations into other chemical forms, and their ultimate fates. We have found that changes in aliphatic, aromatic and N-containing hydrocarbons are evident with depth in exp 210 Pb-dated sediment cores from central Puget Sound. These changes are due both to natural diagenetic processes and to low level inputs of fossil hydrocarbons from a variety of energy related activities. The presence of these hydrocarbons from various chronic sources must be considered and taken into account when assessing potential impacts of any future oil spills or refinery or transshipment terminals proposed for future development. The greatest polynuclear aromatic hydrocarbon fluxes are to central Puget Sound sediments near the major urban areas, rather than in northern Puget Sound near the major refineries. We have found S-containing hydrocarbons in Puget Sound sediments which are largely due to natural sources. In contrast, N-containing hydrocarbons appear largely due to anthropogenic inputs, probably from atmospheric dusts rich in these compounds from combustion processes. The N-containing azaarenes are especially enriched in layers of sediment containing coal particles and may turn out to be good indicators of coal dust contamination of sediments. Our studies of the role of zooplankton fecal pellets in the cycling of trace chemicals in the sea have shown that fecal pellets are an important vertical transport agent for hydrocarbons. 5 figures. (ERA citation 10:003354)

513,341
PB85-138071/GAR PC **A08**/MF **A01**
Duke Univ., Durham, NC. School of Forestry and Environmental Studies.
Wetland Trends and Policies in North Carolina and South Carolina.
Final rept.,
C. Chitterling, C. Clark, J. Lohnes, and H. Nixon. Aug 82, 174p
Grant OTA-233-4550
See also PB84-175918.

The study identifies wetland trends, use factors and institutional structures before and after Federal and State legislation aimed at preserving and protecting wetlands were passed.

513,342
PB85-138311/GAR PC **A04**/MF **A01**
National Marine Fisheries Service, Washington, DC.
Identification and Estimation of Size from the Beaks of 18 Species of Cephalopods from the Pacific Ocean,
Technical rept.,
G. A. Wolff. Nov 84, 59p NOAA-TR-NMFS-17

A method of identifying the beaks and estimating body weight and mantle length of 18 species of cephalopods from the Pacific Ocean is presented. Twenty specimens were selected. Dimensions measured on the upper and lower beak are converted to ratios and compared individually among the species using an analysis of variance procedure with Tukey's omega and Duncan's multiple range tests. Significant differences ($P=0.05$) observed among the species' beak ratio means and structural characteristics are used to construct artificial keys for the upper and lower beaks of the 18 species.

513,343
PB85-138709/GAR PC **A07**/MF **A01**
Louisiana State Univ., Baton Rouge. Sea Grant Legal Program.
Wetland Trends and Factors Influencing Wetland Use in the Area Influenced by the Lower Mississippi River: A Case Study,
L. M. Bahr, and M. W. Wascom. 1982, 134p
See also PB84-175918. Sponsored by Office of Technology Assessment, Washington, DC.

The study identifies wetland trends, use factors and institutional structures before and after Federal and State legislation aimed at preserving and protecting wetlands were passed.

513,344
PB85-139319/GAR PC **E03**/MF **E03**
Centre d'Etude de l'Energie Nucleaire, Mol (Belgium).
Life History of Acetabularia acetabulum (=Mediterranea) in the Laboratory and in Nature,
S. Bonotto, G. Arapis, and M. Paques. Aug 84, 22p
BLG-567
Summaries in French and Dutch.

The authors compare the life cycle of Acetabularia acetabulum (Dasycladaceae) grown under artificial or under natural conditions. New evidence is presented, supporting the view that in nature Acetabularia behaves as a 'pluriannual' plant.

8B. Cartography

513,345
PB84-928050/GAR PC **E02**
Central Intelligence Agency, Washington, DC.
Africa - Penetration of Islam (Map No. 800155); Botswana (Map No. 800122), and Bophuthatswana (Map No. 503536).
Aug 84, 12p
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB84-928000.

The map shows area of Muslim predominance and area of significant Muslim minority. Map scale is 1:51,800,000. The page size map with terrain shading, populated places, administrative divisions and major transportation. Map scale is 1:6,500,000. The map shows populated places and major transportation. Map scale is 1:1,390,000.

8C. Dynamic Oceanography

513,346
AD-A148 657/0/GAR PC **A02**/MF **A01**
Naval Ocean Research and Development Activity, NSTL Station, MS.
Advection of Submesoscale Thermal Features in the Alboran Sea Gyre,
P. E. La Violette. Mar 84, 17p
Pub. in Jnl. of Physical Oceanography, v14 n3 p550-565 Mar 84. Supersedes AD-A133 877.

No abstract available.

513,347
AD-A148 697/6/GAR PC **A02**/MF **A01**
Woods Hole Oceanographic Institution, MA.
Warm-to-Cold Water Conversion in the Northern North Atlantic Ocean,
M. S. McCartney, and L. D. Talley. Aug 84, 17p Rept no. WHOI-CONTRIB-5410
Contracts N00014-74-C-0262, N00014-79-C-0071
Pub. in Physical Oceanography, v14 n5 p921-935 May 84.

No abstract available.

513,348
AD-A148 706/5/GAR PC **A05**/MF **A01**
Naval Surface Weapons Center, Silver Spring, MD.
Elementary Analysis of Ocean Wave Statistics,
D. Lee, and R. H. Baran. Aug 83, 99p Rept no. NSWC/TR-83-350

Ocean wave statistics were obtained from twenty recordings of fifteen minutes each. Spectral densities are presented together with amplitude distributions and the results are discussed in light revelant theories. In particular, it is shown that the sea surface fluctuation is a Gaussian statistic in the majority of cases; but that non-Gaussian fluctuations are observed from time to time.

513,349
AD-A148 793/3/GAR PC **A09**/MF **A01**
SRI International, Menlo Park, CA.

Field Studies of Run-Up Generated by Wind Waves on Dissipative Beaches.
Final technical rept. Feb 80-Mar 84,
C. T. Carlson. Mar 84, 191p

Field measurements of incident waves and the resulting run-up made at two different natural sand beaches along San Francisco Bay show low-frequency energy in the run-up not observed in the corresponding incident-wave spectra. The experiments were conducted in December 1977 at Alameda Beach and in May 1982 at Coyote Point Beach. Both experiments were designed to measure the run-up on dissipative beaches exposed only to high-frequency, narrow-band wind waves at the exclusion of lower frequency swell. Criteria for field-site selection included a single breaker zone located near the shoreline with incident wind waves that broke by plunging, thereby minimizing reflection and forming a low-energy dissipative beach system. Elimination of the long-wave components in the incident wave field would suppress reflection at the shoreline, minimizing external nonlinear modulation of the run-up by edge waves and standing waves. Amplitude time series measurements of offshore incident waves and the run-up on the beach face were made simultaneously at multiple locations on the beach using 16-mm photography. Coherence analyses indicate that the offshore incident waves and run-up on the beach are not linearly correlated. Correlation analyses conducted on the run-up at alongshore distances up to 3.5 m indicate that the run-up is coherent in the alongshore direction up to this distance.

513,350
DE85002257/GAR PC **A02/MF A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Climatic Freshening of the Deep North Atlantic (North of 50 Degrees N) over the past 20 Years. Final Report.
W. S. Broecker, W. J. Jenkins, P. B. Rhines, C. G. Rooth, and J. H. Swift. 1982, 12p DOE/EV/10486-T1
Contract AI01-80EV10486
Portions are illegible in microfiche products.

The Transient Tracers in the Ocean (TTO) program was initiated as a multi-institution, multi-year effort to study ocean transport processes by measuring the distributions of man-made trace substances as they penetrate into the oceans. During the first major field effort of the TTO program, we carried out a seven leg cruise in 1981, occupying 250 geochemical stations covering the North Atlantic from 15 degrees N to Spitsbergen. Samples were taken for the measurement of tracers such as tritium (and its daughter sup 3 He) and sup 14 C which were produced by atmospheric nuclear weapons testing, and tracers that are byproducts of industrial activities, e.g. sup 85 Kr and trichlorofluoromethane. In addition, a series of precise measurements of nutrients, dissolved oxygen and hydrographic properties were made. We report here preliminary hydrographic results from the three most northerly legs, which show a temperature-salinity relationship throughout a large portion of the water volume north of 50 degrees N systematically different from previously obtained (IGY) data. We contend that this difference is a result of a climatic variation in atmospheric and cryospheric conditions which manifest itself in a net change in the temperature and salinity characteristics of the overflow waters which supply the North Atlantic Deep Water masses. 11 references, 3 figures. (ERA citation 10:003348)

513,351
PB85-133429/GAR PC **A08/MF A01**
National Science Foundation, Washington, DC. Office for the International Decade of Ocean Exploration.
Investigations of the POLEX South-77 Program (Issledovaniya po Programme POLEKS-Yug-77).
A. F. Treshnikov, and V. G. Savchenko. c1984, 163p TT-80-52016
Trans. of Arkticheskii i Antarkticheskii Nauchno-Issledovatelskii Institut. Trudy (USSR) v360 1979 by Y. V. Kathavate. See also PB-301 375-T.

This volume presents the results of hydrometeorological studies in the Australian sector of the Southern Ocean. These studies were carried out in the South Polar summer of 1977 on the research ship Professor Zubov, during the joint Soviet-American expedition under the POLEX South program. The space-time structure of the Antarctic Circumpolar Current (ACC) is explained on the basis of the prolonged instrumental measurements of current velocity at different depths. An attempt has been made to analyze the data on evolution of dynamic eddy formations of cyclonic type, which are important for synoptic purposes. This book should be of interest to scientific workers, graduates and senior students of hydrometeorology, as well as to other specialists interested in the currenty problems of study of the Southern Ocean.

513,352
PB85-136638/GAR PC **A02/MF A01**
Hawaii Inst. of Geophysics, Honolulu.
Time-Dependent Wave Transport Theory,
R. W. Preisendorfer. Oct 77, 25p HIG-77-11, NOAA-JTRE-211

The time-dependent classic canal theory is cast into transport form so that we can write down the space-time evolution of water wave elevation and volume flux as linear functionals involving global reflectance and transmittance functions over the canal. The integrodifferential equations governing these functions are derived. The parallel of the two-flow wave equations with the similar earlier development of time-dependent radiative transfer processes is exact. An application of these ideas to the solution of the open-boundary problem in the sea is indicated.

513,353
PB85-136646/GAR PC **A03/MF A01**
Hawaii Inst. of Geophysics, Honolulu.
Transport Theory of Short Surface Waves,
R. W. Preisendorfer. Jul 77, 28p HIG-77-10, NOAA-JTRE-210

It is shown how the theory of short surface water waves can be formulated so that it is part of a larger transport theory of linear hydrodynamics which has been developed in particular for long surface waves over oceanic and coastal regions. Whether waves are short or long, their theory of propagation over irregular bathygraphy and between irregular coastlines can now be formulated in a uniform manner using a formalism leading to stable numerical procedures (if the bathygraphy is difficult) or to simple classical analytical forms (if the bathygraphy is uniform).

8D. Geochemistry

513,354
N85-12503/7/GAR PC **A02/MF A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Contribution to the Radiogeology of Sao Roque, SP, Granites.
E. B. Pereira, and K. Fujimori. Apr 84, 21p INPE-3079-PRE/492
Submitted for Publication. Text in Portuguese; English Summary.

Gamma-ray spectrometric measurements were performed on 33 hand samples of the Pirituba granite, Sao Roque group, Brazil. The average abundances of potassium, uranium, and thorium are 3.7%, 5.6 ppm, and 12 ppm respectively. The granite presents lower thorium concentration than the global average abundance in granites of the crust. The radiogenic heat production calculated from radioelement concentration is 2.6 micro W/cu m. Field gamma ray spectrometric profiles were also performed with results compatible with the laboratory analyses.

513,355
PB85-145340 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Biological Methylation of Metals and Metalloids.
Final rept.,
J. S. Thayer, and F. E. Brinckman. 1982, 44p
Pub. in Advances in Organometallic Chemistry 20, p313-356 1982.

The current state of understanding biological methylation of metals and metalloids is reviewed with 250 references. The subject is treated both from the viewpoint of organometallic chemists, with emphasis on aquatic transmethylation reactions occurring in vitro under abiotic and biological conditions, and from a phenomenological survey of corresponding in vivo processes occurring in environmental media such as pure cultures, soils, sediments, and animals. Against this background, mechanisms of transmethylation are inspected, and the relationship of trace organometallic speciation applied to biogeochemistry or to modelling environmental pollution are considered.

8E. Geodesy

513,356
PB85-147973 Not available NTIS
National Bureau of Standards (NEL), Boulder, CO.
Fluid-Fiber Gradiometers: Their Promise for Tunnel Detection - A Status Report.
Final rept.,
J. E. Faller, J. K. Hoskins, P. T. Keyser, and T. M. Niebauer. 1984, 19p
Pub. in Proceedings of Technical Symposium on Tunnel Detection (2nd), Golden, CO., September 26-28, 1984, p1-19.

At the Joint Institute for Laboratory Astrophysics, the authors are working on a new type of torsion pendulum gravity gradiometer. In this torsion pendulum apparatus, the traditional fiber is replaced with two surrogates in which the fiber's suspension role is provided entirely by a fluid while its restoring and centering functions are achieved by an appropriate electrode array with adjustable voltages. The authors have constructed -- for purposes of testing the concept -- two fluid gradiometers each 10 inches in diameter, a size such that their sensitivities would theoretically permit one to see the change in gravity gradient resulting from a tunnel at a distance of one kilometer. The authors have also under study one very large 50 inch diameter float whose intended purpose is to improve on the accuracy of the Eotvos experiment (equivalence of gravitational and inertial mass). This float is presently being used as a sensitive test bed to look at the effects of various noise terms on floats in general. At the July 21-23, 1981 Symposium on Tunnel Detection, the authors presented a paper, 'Tunnel Detection Utilizing Field-Stationary Gravity Gradiometry.' Since that time, an experimental program to study this idea has been under way. A number of unforeseen problems have been encountered, but in all cases satisfactory solutions have been found. The authors briefly review the idea and the present status of this work, and discuss their prognosis for this type of device as a field-practical instrument.

8G. Geology and Mineralogy

513,357
AD-A148 589/5/GAR PC **A07/MF A01**
California Inst. of Tech., Pasadena. Seismological Lab.
Detailed Oceanic Crustal Modeling.
Final rept. 1 Feb 81-31 May 84,
D. V. Helmberger. 7 Nov 84, 138p
Contract N00014-76-C-1070

The research performed under this contract can be divided into 3 main topics: changes in existing methods, Cagniard de-Hoop and WKBJ, which enable construction of synthetics for mixed path simulations; use of long period SH waves with source in the Northwest Atlantic and receivers on the northeast coast of North America to derive an oceanic upper mantle shear velocity model; and a technique based on evaluating the Kirchoff-Helmholtz integral for predicting the effect of near source or near receiver structure complexity on far field p waves. In Section II we assess the fact that recent models of upper mantle structure based on long period body waves (WWSSN) suggest large horizontal gradients, especially in shear velocities. Some changes in existing methods are required to construct synthetics for mixed path situations. This is accomplished by allowing locally dipping structure and making some modifications to generalized ray theory. In Section III, we have modeled the SH motion from earthquakes in the northwest Atlantic ocean to derive an oceanic upper mantle shear velocity model. In Section IV, we extend the Kirchoff-Helmholtz integral method to calculate acoustic potentials which transmit through three dimensional warped boundaries.

513,358
AD-A148 623/2/GAR PC **A08/MF A01**

Army Engineer Waterways Experiment Station, Vicksburg, MS. Geotechnical Lab.
Boring Information and Subsurface Data Base Package User's Guide.
Final rept.,
W. E. Strohm, and J. B. Palmerton. Sep 84, 174p
Rept no. WES/IR/GL-84-1
Includes errata sheet dated 19 Nov 84.

A data base package for storage, retrieval, and display of boring and subsurface data for geotechnical projects is described, and detailed instructions for using the package are given with examples for actual projects. The data package is designed for storage, rapid retrieval, and display of boring locations, boring logs and profiles, and contours of selected subsurface data. The package provides for easy, interactive data entry and editing with automatic data checks and error messages when data exceeds user-specified ranges. Data storage and retrieval are accomplished using the Corps of Engineers (CE) purchased copy of SYSTEM 2000 Data Base Management System (trademark of Intel Systems Corp) on the Corps-wide time-sharing service operated (1984) by Control Data Corp (CDC). The data entry and retrieval programs developed for the package are designed for a low skill level and minimum training of personnel. Data entry can also be accomplished on CE District Harris computers. Originator-supplied keywords include: Information storage and retrieval systems--Boring, Boring--Computer programs, BORDB (Information retrieval system), Data base management, Underground areas.

513,359
DE85000042/GAR PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Subsurface Investigations South of Building 612 at the Lawrence Livermore National Laboratory.
D. Towse. Aug 84, 22p UCID-20219
Contract W-7405-ENG-48

Eight exploratory drill holes have been drilled into Quaternary alluvium south of Building 612 in the southeast part of the Laboratory. Initial work suggested the possibility that channel gravels were offset due to faulting. Closely spaced additional drill-holes and continuous sampling showed local channeling and erratic development of the alluvial sediments. No structural offset was found. 7 references, 5 figures. (ERA citation 10:003524)

513,360
DE85000428/GAR PC **A02**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
X-Ray Spectroscopic Investigation of Metamictization and Annealing in Crystalline Phosphates, Silicates and Complex Ti-Nb-Ta Oxides. Final Report.
R. B. Greegor, and F. W. Lytle. Sep 84, 12p DOE/ER/45010-T1
Contract AC06-83ER45010
Portions are illegible in microfiche products.

Metamict minerals have been damaged by the radioactive decay of their U and Th components and have been exposed to geologic processes over periods of many hundreds of millions of years. These metamict minerals can be considered to be the products of a natural long-term radiation damage experiment, hence there will be increased interest in the long term stability of these minerals because of their crystal-chemical similarities with phases in proposed waste-forms. A study was initiated of the effects of metamictization and annealing on crystalline phosphates, silicates and complex A/sub x/B/sub y/O/sub z/-type Ti-Nb-Ta oxides. This study included a detailed examination of the near neighbor site geometries of metal atoms in metamict minerals (e.g., A (Ca) and B (Ti) site cations) as determined by extended x-ray absorption fine structure (EXAFS) and x-ray absorption near edge structure (XANES) spectroscopy. (ERA citation 10:003532)

513,361
DE85000859/GAR PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Large Natural Geophysical Events: Planetary Planning.
J. B. Knox, and J. V. Smith. Sep 84, 34p UCRL-91356, CONF-8408122-1
Contract W-7405-ENG-48
International conference on nuclear war, Erice, Sicily, Italy, 19 Aug 1984.

Geological and geophysical data suggest that during the evolution of the earth and its species, that there have been many mass extinctions due to large impacts from comets and large asteroids, and major volcanic events. Today, technology has developed to the stage where we can begin to consider protective measures for the planet. Evidence of the ecological disruption and frequency of these major events is presented. Surveillance and warning systems are most critical to develop wherein sufficient lead times for warnings exist so that appropriate interventions could be designed. The long term research undergirding these warning systems, implementation, and proof testing is rich in opportunities for collaboration for peace. (ERA citation 10:003568)

513,362
DE85001052/GAR PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Vertical Electromagnetic Profiling (VEMP).
R. J. Lytle. 1 Aug 84, 28p UCRL-91395, CONF-840572-5
Contract W-7405-ENG-48
International symposium on observation of the continental crust through drilling, Tarrytown, NY, USA, 20 May 1984.
Portions are illegible in microfiche products.

Vertical seismic profiling (VSP) is based upon reception measurements performed in a borehole with a source near the ground surface. This technology has seen a surge in application and development in the last decade. The analogous concept of vertical electromagnetic profiling (VEMP) consists of reception measurements performed in a borehole with a source near the ground surface. Although the electromagnetic concept has seen some application, this technology has not been as systematically developed and applied as VSP. Vertical electromagnetic profiling provides distinct and complementary data due to sensing different physical parameters than seismic profiling. Certain of the advantages of VEMP are presented. 28 references, 7 figures. (ERA citation 10:003529)

513,363
DE85001663/GAR PC **A03**/MF **A01**
Geological Survey, Denver, CO.
Principal Facts and Density Estimates for Borehole Gravity Stations in Boreholes RRL-3, -4, -5, -6B, -7, -8, and -9 at the Hanford Site, Benton County, Washington.
S. L. Robbins, F. G. Clutsom, and J. R. Kunk. Jul 83, 49p RHO-BW-CR-139-P, USGS-OFR-83-386
Contract AC06-77RL01030
Portions are illegible in microfiche products.

Borehole gravity surveys were conducted in seven boreholes, located within a 10-mile exp 2 (25-km exp 2) area in the northwestern portion of the Hanford Site, Washington, in June and July 1982 using La Coste and Romberg slim-hole borehole gravity meter (BHGM) BH-6. The primary objective was to obtain accurate, average, in situ densities of the sediments that overlie the basalts in the area. These density values along with lithology data and other well-log information will be integrated into a three-dimensional density model to be used with a detailed surface gravity survey of the area to determine the location of the top of the basalt, which varies between about 600 and 800 ft (200 and 270 m) below the surface. This study is part of the US Department of Energy's assessment as to whether the basalt is suitable for the storage of radioactive wastes. This report contains the principal facts obtained during the surveys and estimates of in situ bulk densities from these data. Also included are reduced sections of the gamma-ray logs with the BHGM station locations indicated and summaries of the stratigraphic section for each borehole. 9 references, 15 figures, 16 tables. (ERA citation 10:003534)

513,364
DE85001666/GAR PC **A03**/MF **A01**
University of South Florida, St. Petersburg. Dept. of Marine Science.
West Florida Continental Shelf: A Study of Geothermal Flows and Other Processes Affecting Radionuclides and Trace Metals. Final Report, July 1, 1977-September 30, 1982.
K. A. Fanning, P. R. Betzer, and R. H. Byrne. 1982, 31p DOE/EV/05486-1
Contract AS05-77EV05486
Portions are illegible in microfiche products.

The characteristics and distribution of submarine geothermal springs along Florida's west coast were studied. The composition of the effluent, expressed as chlorinity ratios, indicates the source is normal seawater. Six springs have been definitely identified, occupying an 85 km exp 2 area off Fort Myers, Florida. The effluent is acidified, impoverished in magnesium and phosphate, and enriched in calcium, silica, Ra-226, Rn-222 and metals, and reduced compared to the parent seawater. 6 references, 5 figures, 2 tables. (ERA citation 10:003351)

513,365
DE85001725/GAR PC **A09**/MF **A01**
Dartmouth Coll., Hanover, NH.
Laboratory Index Testing of Rock Samples for the Determination of Clay Mineralogy from the Detten No. 1 (PD-6) Well, G. Friemel No. 1 (PD-5) Well, Mansfield No. 1 (PD-4) Well, and Zeeck No. 1 (PD-7) Well - Palo Duro Basin, Texas: Unanalyzed Data.
R. C. Reynolds. Sep 84, 196p BMI/SRP-5018
Contract AC02-83CH10140
Portions are illegible in microfiche products.

This report contains the type and abundance of clay minerals determined for rock samples from the Detten No. 1 (PD-6) Well, G. Friemel No. 1 (PD-5) Well, Mansfield No. 1 (PD-4) Well, and Zeeck No. 1 (PD-7) Well - Palo Duro Basin, Texas. Descriptions of hand samples, photographs, x-ray diffraction charts, J.C.P.D.S. cards, and data reduction are included in the appendices. These data are preliminary. They have been neither analyzed nor evaluated. (ERA citation 10:001331)

513,366
DE85002158/GAR PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Geoengineering Characterization of Welded Tuffs from Laboratory and Field Investigations.
R. M. Zimmerman, F. B. Nimick, and M. P. Board. 1984, 12p SAND-84-1147C, CONF-841157-10
Contract AC04-76DP00789
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1984.
Portions are illegible in microfiche products.

Welded tuff beneath Yucca Mountain adjacent to the Nevada Test Site (NTS) is being considered for development as a high-level radioactive waste repository by the Nevada Nuclear Waste Storage Investigations (NNWSI) Project. Because access into Yucca Mountain has been limited to borehole explorations, early geoengineering materials characterizations have been derived from laboratory tests on cores from Yucca Mountain and from laboratory and field tests on welded tuffs located in G-Tunnel on the NTS. G-Tunnel contains welded tuffs that have similar properties and stress states to those at Yucca Mountain and has been the location for in situ rock mechanics testing. The purpose of this paper is to summarize the geoengineering material property data obtained to date and to compare appropriate laboratory and field data from G-Tunnel to findings from Yucca Mountain. Geomechanical and thermal data are provided and are augmented by limited geological and hydrological data. A comparison of results of laboratory measurements on tuffs from Yucca Mountain and G-Tunnel indicates good agreement between the bulk densities, saturations, moduli of elasticity, Poisson's ratios, and P-wave velocities. The G-Tunnel tuff has slightly lower thermal conductivity, tensile strength, compressive strength and slightly higher matrix permeability than does the welded tuff near the proposed repository horizon at Yucca Mountain. From a laboratory-to-field scaling perspective, the modulus of deformation shows the most sensitivity to field conditions because of the presence of the joints found in the field. 14 references, 1 table. (ERA citation 10:003536)

513,367
DE85002350/GAR PC **A05**/MF **A01**
Los Alamos National Lab., NM.
KRAK: A Computer Program for Two-Phase, Two-Component Porous Flow and Fracture.
B. J. Travis, A. H. Davis, T. D. Kunkle, and R. G. Deupree. Sep 84, 96p LA-9703
Contract W-7405-ENG-36

The KRAK code models the mass, momentum, and energy flow of steam, liquid water, and a noncondensable gas in a porous medium. It can model the initiation and propagation of hydrofracture in this medium by any or all of the fluid components using finite difference techniques. The interaction of the flow and the cracking is self-consistently performed. Furthermore, flow in the crack is treated by a full-momentum equation, which allows rapid fracturing. The code has been used in studies of the underground containment of radioactive gases produced by nuclear explosions and of

siting underground nuclear power reactors. The code could also be applied to a wide variety of geophysical situations such as geothermal energy extraction, geysers, convection in a fractured medium, and explosive well stimulation. The physical model includes heat transfer between the porous medium and the flowing fluid, an equation of state that allows fluid condensation and evaporation, a model for the viscosity of each fluid component and the composite viscosity, and a permeability model that successfully treats interfaces of greatly differing permeabilities (produced by either different materials or different states of the same material). Cracking is controlled by a simple fracture mechanics model. These features are discussed in detail. The finite difference equations and their solution are given. Appendixes include a list of input variables, a subroutine summary, a code listing, and a sample problem. (ERA citation 10:003650)

513,368
DE85002657/GAR PC A05/MF A01
Geological Survey, Denver, CO.
Preliminary Geologic Map of Yucca Mountain, Nye County, Nevada with Geologic Sections.
R. B. Scott, and J. Bonk. 1984, 88p USGS-OFR-84-494
Contract AI08-78ET44802
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

No abstract available.

513,369
N85-12504/5/GAR PC A03/MF A01
California Inst. of Tech., Pasadena.
Dynamic Compression and Volatile Release of Carbonates.
J. A. Tyburczy, and T. J. Ahrens. 13 Nov 84, 50p
NAS 1.26:174076, NASA-CR-174076
Contract NGL-05-002-105

Particle velocity profiles upon shock compression and isentropic releases were measured for polycrystalline calcite. The Solenhofen limestone release paths lie, close to the Hugoniot. Calcite 3 to 2 transition, upon release, was observed, but rarefaction shocks were not detected. The equation of state is used to predict the fraction of material devolatilized upon isentropic release as a function of shock pressure. The effect of ambient partial pressure of CO2 on the calculations is demonstrated and considered in models of atmospheric evolution by impact induced mineral devolatilization. The radiative characteristics of shocked calcite indicate that localization of thermal energy occurs under shock compression. Shock entropy calculations result in a minimum estimate of 90% devolatilization upon complete release from 10 GPa. Isentropic release paths from calculated continuum Hugoniot temperatures cross into the CaO (solid) + CO2 (vapor) field at improbably low pressures. It is found that release paths from measured shock temperatures cross into the melt plus vapor field at pressures greater than .5 GPa, which suggests that devolatilization is initiated at the shear banding sites.

513,370
PB85-131639/GAR PC A17/MF A01
Geosciences Research Associates, Inc., Bloomington, IN.
Survey of Potential National Natural Landmarks, Biotic Themes, of the Mississippi River Alluvial Plain.
Final rept.,
J. H. Keith. Sep 84, 388p
Contract NPS-CX-0001-2-0029

This study is one of a series of 61 which cover the natural regions of the United States, defined largely by Fenneman (1928). Each study describes the ecological and/or geological features characteristic of that region, then evaluates sites representative of the various features. Sites which are outstanding examples are proposed as potential National Natural Landmarks. This study reports on the ecological sites in the Mississippi River Alluvial Plain section of the Gulf Coastal Plain Natural Region. The geologic setting, landforms, climate, soils, vegetation, landuse and fauna of the natural region is briefly described, and finally 31 ecological communities are also described.

513,371
PB85-139137/GAR PC A14/MF A01
Kentucky Univ., Lexington. Inst. for Mining and Minerals Research.
Chemical and Engineering Properties of Eastern Oil Shale.
Final rept.,
T. L. Robl, and D. W. Koppenaal. Oct 82, 316p
IMMR82/066
Sponsored in part by Kentucky Dept. for Natural Resources and Environmental Protection, Frankfort, and Kentucky Energy Cabinet, Lexington.

During the past few years mineral and oil companies have acquired mineral rights to oil shale in Kentucky. Research has also been initiated into the development of processes, such as the HYTORT technology and modifications of the Paraho retort, which will process these shales in an optimal fashion. A recent study sponsored by the U.S. Department of Energy concluded that an oil shale industry in Kentucky was feasible. These factors have contributed to growing interest by the public sector in the problems and potential of a Kentucky oil shale industry. This research is in part a response to this interest and is an outgrowth of discussions between personnel of the Kentucky Department of Natural Resources and Environmental Protection, the Kentucky Department of Energy, and the University of Kentucky Institute for Mining and Minerals Research. This project is designed to provide preliminary information into environmental areas, where data was lacking or insufficient. These areas included the water pollution potential, agricultural characteristics, and strength and compaction characteristics of raw and processed oil shales, overburdens, and associated soils.

8H. Hydrology and Limnology

513,372
DE85002238/GAR PC A03/MF A01
Sandia National Labs., Albuquerque, NM.
Water Transport Through Welded Tuff.
G. R. Hadley. Aug 84, 43p SAND-82-1043
Contract AC04-76DP00789

Water transport through welded tuff was studied with the aid of three drying experiments and one imbibition experiment performed on a single 0.15-m-long core. The specimen was saturated using a novel technique which measures the volume of water imbibed as a function of time in order to insure complete saturation. Profiles of saturation vs axial position along the core were provided by measuring the intensity of a beam of 662 keV gamma ray photons after passing through the sample in a direction normal to the axis of the cylinder. Measurements were made at different axial locations by moving the sample chamber past the beam with a precision translation table. Results indicate that the drying process is, in general, not characterized by a receding evaporation front as has been previously assumed, but rather by evaporation throughout the sample. Water appears to move through the sample under the action of both capillary forces and vapor pressure gradients induced by temperature gradients. Profiles resembling those of a receding evaporation front were observed when the temperature gradient was aligned in the direction of moisture transport. This work was performed in support of the Nevada Nulcear Waste Storage Investigation Project, which is responsible for examining the feasibility of siting a repository for commercial high-level nuclear wastes at Yucca Mountain and adjacent to the Nevada Test Site. 11 references, 9 figures. (ERA citation 10:003535)

513,373
PB85-127650/GAR PC A13/MF A01
Geological Survey, Huron, SD. Water Resources Div.
Water Resources Data for South Dakota, Water Year 1983.
Water-data rept. (Annual) 1 Oct 82-30 Sep 83,
E. B. Hoffman, N. F. Leibbrand, D. R. Winter, and R. D. Benson. Sep 84, 279p USGS/WRD/HD-84/063, USGS/WDR/SD-83/1
See also PB83-102715.

Water Resources Data for the 1983 water year for South Dakota consists of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels in wells. This report contains discharge records for 107 gaging stations, stage and contents for 13 lakes and reservoirs; water quality for 26 gaging stations; and water levels for 7 observation wells.

513,374
PB85-136703/GAR PC A11/MF A01
Arizona Univ., Tucson.
Regional Training Course in Natural Resources Management and Environmental Monitoring in Humid-Tropical Ecosystems,
P. F. Ffolliott. Feb 80, 229p AID-PN-AAL-836

A regional training course in watershed resources management and environmental monitoring was conducted to help LDC resource managers and land use planners identify proper management practices. Topics are as follows: (1) concepts of watershed resource management; (2) statistical methods; (3) the hydrologic cycle; (4) inventory techniques; (5) hydrologic methods; (6) vegetative management and water yield; (7) erosion processes and control; (8) water quality; (9) water harvesting; (10) reservoir management.

513,375
PB85-137834/GAR PC A06/MF A01
Arizona Univ., Tucson.
Regional Training Course in Natural Resources Management and Environmental Monitoring: Problem Manual,
P. F. Folliott. Oct 81, 102p AID-PN-AAL-837
Contract AID/CSD-2457

To supplement the syllabus for a regional training course on watershed resources management and environmental monitoring, this manual of relevant problem sets was prepared for natural resource managers and land use planners concerned with watershed resources. Part I provides problem sets on: statistical methods and inferences; the water budget; rainfall-runoff analysis, including mean basin precipitation, loss rates, hydrograph derivation and reconstruction, and soil runoff estimation; soil erosion; reservoir management; modeling; remote sensing; and decision-making.

513,376
PB85-138113/GAR PC A04/MF A01
National Oceanic and Atmospheric Administration, Ann Arbor, MI. Great Lakes Environmental Research Lab.
Great Lakes Environmental Research Laboratory Annual Report FY 1983.
Dec 83, 52p
See also PB-299 431.

The Great Lakes Environmental Research Laboratory (GLERL) has completed its ninth year of operation in Ann Arbor. Our mission at GLERL is to conduct research directed toward understanding the environmental processes and solving problems in resource management and environmental services in coastal and estuarine waters, with a special emphasis on the Great Lakes. The report describes investigations on the limnological, hydrological, and meteorological properties of the lakes, their basins, and the overlying atmosphere.

513,377
PB85-142594 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Vertical Temperature Distribution in Lakes.
Final rept.,
R. D. Noble, N. J. Kemp, and R. G. Buschman. 1985, 13p
Pub. in Jnl. of Environmental Systems 14, n1 p63-75 1984-85.

Analytical solutions are presented for the vertical temperature distribution in lakes. The solutions are good for large water bodies where inflows and outflows are negligible. The solution is based on a linearization of the surface heat exchange term. Solutions are presented for both zero-order and first order linearizations. An analytical expression is used to describe the actual daily absorbed radiation at the air-water interface. The model contains no adjustable parameters. A comparison of model results with experimental data is presented.

8I. Mining Engineering

513,378
AD-P004 293/7/GAR PC A02/MF A01
Stevens Inst. of Tech., Hoboken, NJ.
Stability Indicators for Front End Loaders,
G. Wray, J. Nazalewicz, and A. J. Kwitowski. Aug 84, 17p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p655-671.

This paper describes the development of a stability-indicating system for use in minimizing the occurrence of front-end loader (FEL) roll-overs in mining. The development proceeded in three phases: definition of FEL stability-instability characteristics; design of a 1st generation stability indicator; and design of a simplified, 2nd generation stability indicator. Goals met by the final design include confirmation of a simplified methodology for detecting machine instability; the ability to be installed on new loaders during manufacture or on older loaders on a retrofit basis; and reliable, easily interpretable operation. (Author)

513,379
PB85-135804/GAR PC A02/MF A01
Bureau of Mines, Spokane, WA. Spokane Research Center.
Field Measurement of Rock Displacement and Support Pressure at 5,955-Ft Level during Sinking of Deep Circular Shaft in Northern Idaho.
Rept. of investigations/1984,
M. J. Beus, and M. P. Board. 1984, 18p BUMINES-RI-8909
Library of Congress catalog card no. 84-600192. Prepared in cooperation with Minnesota Univ., Minneapolis.

The Bureau of Mines, under a cooperative agreement with Hecla Mining Co., is conducting a rock mechanics study of the 6,200-ft-deep circular, concrete-lined Silver Shaft in northern Idaho. The objective of the project was to instrument and evaluate lining behavior and rock deformation when a deep shaft is constructed in a high in situ stress field and anisotropic rock mass. Rock mass displacements were monitored with multiple-position borehole extensometers. Liner stress and strain were measured with concrete pressure cells and embedment strain gauges.

513,380
PB85-137628/GAR PC A02/MF A01
Bureau of Mines, Salt Lake City, UT. Salt Lake City Research Center.
Calcium Sulfide Precipitation of Mercury during Cyanide Leaching of Gold Ores.
Rept. of investigations/1984,
R. G. Sandberg, W. W. Simpson, and W. L. Staker. 1984, 20p BUMINES-RI-8907
Library of Congress catalog card no. 84-600156.

Many gold-bearing ores throughout the Western United States contain small quantities of mercury. The presence of mercury not only decreases the gold-loading capacity of the activated carbon, but complicates the fire refining of cathodes and creates a potential health hazard. The Bureau of Mines investigated methods to limit mercury extraction during gold ore leaching and to remove mercury from cyanide leach solutions.

513,381
PB85-138097/GAR PC A12/MF A01
Dames and Moore, Denver, CO.
Assessment of Development and Production Potential of Federal Coal Leases. Volume 2. Working Papers. Part A. The Development Prospects for Federal Coal Leases in Colorado 1980-1991: Results of Colorado Coal Leasing Task Force.
Working paper.
Jun 84, 258p
See also PB83-180901, and PB85-138105. Sponsored by Office of Technology Assessment, Washington, DC.Portions of this document are not fully legible.

These working papers contain papers for OTA to assist in preparation of the report An Assessment of Development and Production Potential of Federal Coal Leases. The contents include: the development prospects for federal coal leases in Colorado.

513,382
PB85-138105/GAR PC A05/MF A01
Dames and Moore, Denver, CO.
Assessment of Development and Production Potential of Federal Coal Leases. Volume 2. Working Papers. Part 1, Vol. 1. Analysis of Federal Coal Leases in Mine Plans in Colorado, New Mexico, Oklahoma, and Utah.
Working paper no. 1.
Jun 84, 89p R-10697-004-14
See also PB85-138097. Sponsored by Office of Technology Assessment, Washington, DC.

These working papers contain papers written for OTA to assist in preparation of the report An Assessment of Development and Production Potential of Federal Coal Leases. The contents include: analysis of federal coal lease mine plans in Colorado, New Mexico, Oklahoma, and Utah.

513,383
PB85-139954/GAR PC A10/MF A01
Martin Consultants, Inc., Golden, CO.
Guideline Manual for Hopper/Crusher/Conveyor Systems Used with Front-End Loaders.
Open file rept. 22 Jan-27 Aug 82,
J. W. Martin, T. J. Martin, D. W. Gentry, M. J. Hrebar, and T. P. Bennett. Aug 82, 207p BUMINES-OFR-212-84
Contract J0205045
See also PB83-115014.

This user's manual analyzes the application, selection, and performance of hopper-crusher-conveyor systems used with front-end loaders in surface mining operations. It is designed to be used in conjunction with its companion manual, 'Guideline Manual for Front-End Loader Load-and-Carry Applications,' (Bureau of Mines Open File Report 169-82. Aspects of the application are covered as well as design considerations of the hopper-crusher-conveyor units. Lists of equipment manufacturers and crusher specifications, together with a series of checklists, are included for preliminary analysis.

8J. Physical Oceanography

513,384
AD-A148 731/3/GAR PC A08/MF A01
Naval Postgraduate School, Monterey, CA.
Critical Analysis of Ocean Thermal Analysis Models in Operation at FNOC (Fleet Numerical Oceanography Center's).
Master's thesis,
B. J. Brady. Sep 84, 161p Rept no. NPS-68-84-015

The objectives of this research are firstly to obtain a description of the characteristics of the ocean thermal structure from a portion of the ocean (ca.37 degs N to 39 deg N; 124 degs W to 126 deg W) sampled during the three cruises comprising OPTOMA5 which took place in June and July 1983. (OPTOMA - Ocean Prediction Through Observations, Modeling, and Analysis, is a joint Harvard/NPS project 'intended to acquire field data to characterise synoptic scale eddies over a domain in the California Current off Northern California, and to 'set-up' an eddy-resolving, statistical/dynamical, limited domain, open boundary numerical ocean prediction model. The '5' indicates the fifth series of cruises of the project). Secondly, the analysed ocean thermal structure is to be used as a 'sea truth' by which to evaluate the accuracy of two real-time ocean thermal analysis systems presently in use at the Fleet Numerical Oceanography Center (FNOC), namely, the Expanded Ocean Thermal Structure (FCTS) analysis and the Thermodynamic Ocean Prediction System (TOPS)-Coupled EOTS (TEOTS) analysis. The final objective is to determine the operational significance of deviations in the modeled thermal structure from the 'sea truth' by utilizing the output from operational acoustic models to provide a quantitative measure of the effect of these thermal structure differences on acoustic propagation in the ocean. Two low-frequency, passive-acoustic models were used to provide a measure of the variability of acoustic energy propagation which could be expected from the acoustic models alone.

513,385
DE84012278/GAR PC A02/MF A01
Sandia National Labs., Albuquerque, NM.
Analysis of Slope Stability, Wilmington to Lindenkohl Canyons, US Mid-Atlantic Margin.
G. Almagor, R. H. Bennett, D. N. Lambert, E. B. Forde, and L. E. Shephard. 1984, 24p SAND-84-1015C, CONF-841217-1
Contract AC04-76DP00789
IUTAM conference on soil mechanics, Austin, TX, USA, 1 Dec 1984.
Portions are illegible in microfiche products.

The continental slope gradient in the study area averages 7 to 8 exp 0 . Many valleys, canyons, and occasionally large sediment slumped masses occur. Moderate to steep slopes (19 to 27 exp 0) as well as very steep to precipitous slopes (> 27 exp 0) are abundant and occupy about 7% of the investigated area. The surficial sediments are predominantly terrigenous silty clays of medium to high plasticity (I/sub p/ = 10 to 35% w/sub L/ = 30 to 70%), but contain varying quantities of sands. Angles of internal friction are anti phi/sub d/ = 27 to 32 exp 0 , anti phi/sub cu/ = 30 to 33 exp 0 , and phi/sub cu/ = 14 to 17 exp 0 . The sediments are normally to slightly overconsolidated, but some unconsolidated sediments also were identified. c/sub u//anti p sub 0 values range from 0.12 to 0.78. An analysis of force equilibrium within the sediments reveals that (a) the gentle slopes in the study area are mostly stable; (b) that the stability of some steep slopes (19 to 27 exp 0) is marginal; and (c) that on precipitous slopes (> 27 exp 0) only a thin veneer of sediments can exist. Observations of these slopes during steep dives support these results. The analysis shows that additional accumulation of sediments and small shocks caused by earthquakes or internal waves can cause the slopes to fail. Collapse resulting from liquefaction in the uppermost slope along the canyons and valley axes, where fine sands and silt accumulate, also is likely. 22 references, 9 figures, 2 tables. (ERA citation 10:003540)

513,386
N85-12571/4/GAR PC A04/MF A01
Institute of Oceanographic Sciences, Birkenhead (England).
Introduction to the MIAS Conversion System.
S. G. Loch. 1984, 66p IOS-184

The reformatting of oceanographic data (mostly on magnetic tape) to make it readable by a Honeywell 66/DPS300 implemented data base is described.

513,387
PB85-129179/GAR PC A08/MF A01
National Science Foundation, Washington, DC. Div. of Polar Programs.
Problems of the Arctic and the Antarctic, Collection of Articles, Vol. 53,
A. F. Treshnikov. c1984, 152p TT-81-52035
Trans. of Problemy Arktiki i Antarktiki (USSR). Sbornik Statei, v53 p1-143 1978 by Y. V. Kathavate. See also PB84-156538.

Contents:
- Model of wind drift of open pack and very open pack ice;
- Peculiarities of the relationship between mean monthly air temperatures in the Kara Sea and the intensities of air-mass transport;
- Calculation of displacement of the ice edge in Antarctic polynyas;
- Some results of study of the water masses of the Norwegian and Greenland Seas using the method of principal components;
- Radiohydroacoustic method of investigating the dynamics of sea ice;
- Results of hydrooptical studies carried out during the twenty-second cruise of the research ship Professor Vize;
- Temperature and salinity dependence of the refractive index of sea water;
- Wave processes and stresses in ice cover;
- Evaluation of the precision of calculation of the moduli of river-bed resistance;
- Some problems of unsteady open-channel flow hydrometry;
- Penetration of solar radiation into snow-ice cover in the lower reaches and estuaries of Arctic Rivers;
- Investigation of meridional motion of the Auroral absorption region;
- Dynamics and structure of the westerly electrojet from the data of ground observatories;
- Development of a magnetic storm in the evening sector;

Electronic clock in automatic hydrometeorological instruments.

513,388
PB85-138261/GAR PC **E04/MF E04**
Science and Engineering Research Council, Chilton (England). Rutherford Appleton Lab.
Measurement of the Complex Refractive Index of Sea Ice and Snow Using a Microwave Untuned Cavity,
R. J. Knight, and D. T. Llewellyn-Jones. c1984, 35p RAL-84-093

Ice, snow and water cover more than three quarters of the earths surface, knowledge of their spatial and temporal variations are major inputs to studies of climatology, oceanography and resource management. The collection of this data on a global scale is only practical by remote sensing from satellites, and thus an understanding of the interaction between electomagnetic radiation and the various constituent parts of the hydrosphere is essential. The polar regions, in particular, pose special problems in remote sensing. Not only are they significant reservoirs in the global heat budget and the hydrological cycle, but the wide diversity of physical characteristics found in the surface topography make the analysis of remote sensing data difficult. As part of a joint SERC/NERC project on remote sensing in the polar regions, a new technique using an untuned cavity has been used to measure the dielectric properties of sea ice and snow at frequencies between 9 GHz and 120 GHz. Measurements at one frequency, 13.7 GHz, were made to assist in the interpretation of remotely sensed radar altimeter data from concurrent aircraft overflights. The cavity, approximately 1m diameter and 1.2m high, was located on board the NOAA research ship 'Discoverer' during the February 1983 Marginal Ice Zone Experiment (MIZEX WEST) in the Bering Sea. (Copyright (c) Science and Engineering Research Council 1984.)

8K. Seismology

513,389
AD-A148 686/9/GAR PC **A04/MF A01**
Colorado School of Mines, Golden. Center for Wave Phenomena.
Acoustic Tomography in Boreholes Using an Algebraic Reconstruction Technique.
Technical rept.,
K. L. Smith. 5 Nov 84, 72p Rept no. CWP-012
Contract N00014-84-K-0049

An algebraic reconstruction technique (ART) is described for the seismic tomography of velocities from the travel times of a multiple offset vertical seismic profile. ART concentrates on the production of a reconstructed field whose projected data (travel times) agree with the observed data. This reconstructed field is modified by altering the data for each ray such that when this data is back-projected, the new image agrees with the original data. Because the paths of the rays must be known to calculate the expected travel times, the problem is linearized by using raypath approximations as determined from either a constant or a linear c(z) velocity medium. Imaging of synthetic data revealed that the orientation of the anomaly affects both the rate of convergence and the resolution of the reconstructed field. Some smoothing of the velocity anomalies occurred along the direction of the rays. Noisy data sets developed problems in the reconstructed velocity field. Huge single point anomalies appeared along the model's edge in the reconstructed image.

513,390
DE85001078/GAR PC **A02/MF A01**
Lawrence Livermore National Lab., CA.
High-Resolution Microseismicity Study of Possible Magmatic Intrusion in the Long Valley Caldera.
A. T. Smith. 24 Jan 84, 16p UCRL-90278, CONF-840175-1
Contract W-7405-ENG-48
Active tectonic and magmatic process in Long Valley Caldera, California conference, Napa, CA, USA, 24 Jan 1984.
Portions are illegible in microfiche products.

During August 1982, a dense network of 14 seismic stations was deployed in the southwest moat of the Long Valley Caldera. Ten sites used three component seismometers, and all sites used digital event recorders sampling at 200 samples/s with an array trigger criterion to reject local noise and to ensure accurate relative timing. The network recorded microseismicity to magnitude zero, the USGS shots from Casa Diablo to Mono Lake and Adobe Hills, and small local shots to constrain the near surface velocity structure. Hypocenters, station corrections, and velocity structure were simultaneously determined using all this data. The analysis concentrated on a swarm of earthquakes which occurred during August 9, along a vertical plane which was tangent to the resurgent dome. The events occurred along a 0.5 km segment of the plane between depths of 2.5 to 3.5 km. Additional events occurred to depths of 9 km, but not directly beneath the swarm: the deeper events are located from 0.5 to 1.0 km from the swarm epicenters. The configuration suggests intrusion of magma or volatiles: the shallow swarm was above the intrusion; the deeper events occurred along the perimeter of the upwelling. Focal mechanisms of events within the swarm support this interpretation, and indicate that the tensional axis is perpendicular to the plane of seismicity. 18 references, 5 figures. (ERA citation 10:003528)

513,391
PB85-133262/GAR PC **A02/MF A01**
Ministerio de Vivienda y Construccion, Lima (Peru). Oficina de Investigacion y Normalizacion.
Que Son los Terremotos (What Are Earthquakes),
L. Raymond, and D. Huaco. 1984, 23p AID-PN-AAL-233
Contract AID/ta-C-1345
Text in Spanish.

In the aftermath of an earthquake, many questions abound as to the causes and effects of this phenomenon. This report provides answers to just such questions as posed by Peruvians to post-earthquake extensionists. After explaining the geophysical causes of earthquakes, two types of waves (lateral and vertical) produced by earthquakes and the mechanics of wave action on the movement and destruction of buildings are described. Recommendations for earthquake-resistant structural design - wall height, thickness, and weight - are made. Given the long history of earthquake occurrence in Peru and other areas of the world, the desirability of scientifically predicting seismic activity is recognized; some methods for measuring earth movements and for seismic monitoring are discussed.

8L. Snow, Ice, and Permafrost

513,392
AD-A148 737/0/GAR PC **A02/MF A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Solving Problems of Ice-Blocked Drainage.
Technical digest,
K. L. Carey. Sep 84, 12p Rept no. CRREL-84-2

No abstract available.

513,393
AD-A148 738/8/GAR PC **A02/MF A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Ice-Blocked Drainage: Problems and Processes.
Technical digest,
K. L. Carey. Nov 83, 12p Rept no. CRREL-83-2

No abstract available.

513,394
AD-A148 739/6/GAR PC **A02/MF A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Melting Ice with Air Bubblers.
Technical digest,
K. L. Carey. Mar 83, 14p Rept no. CRREL-83-1

No abstract available.

8M. Soil Mechanics

513,395
AD-A148 741/2/GAR PC **A04/MF A01**
Cambridge Univ. (England). Dept. of Engineering.
Stability of Low Embankments on Soft Clay. Part 1. Tests with Centrifuge Vane and Penetrometers on Clay Cakes in a Normal Gravity Field.
Final technical rept.,
M. S. S. Almeida, and R. H. G. Parry. Nov 84, 71p
Contract DAJA37-82-C-0177
See also Part 2, AD-A148 742.

Small vane and penetrometer devices have been developed to measured soil properties in centrifuge models during flight. Early models of these devices, and subsequent improved devices which allow separation of shaft friction from cone or vane resistance, are described, and results presented from tests on consolidated clay cakes in a normal gravity field. A small piezocone has also been developed. Vane results are shown to be strongly influenced by vane diameter, but not vane height, by elapsed time between insertion and rotation of the vane and by the rate of rotation. From these results a vane size of 18 mm diameter by 14 mm high is recommended with a rotation rate of 72/min. A penetration rate of 5 mm/s is found to be suitable for a 10 mm diameter cone although in fact penetration rate was found to have little influence on the measured cone resistance. A consistent relationship could not be established between cone resistance and vane strength. The ratio of cone resistance to vane strength was found to increase with increasing overconsolidation ratio, but was also found to depend on various other factors such as vane and cone sizes and testing rates. The values also differed considerably between the two clays used, Gault clay and kaolin.

513,396
AD-P004 286/1/GAR PC **A02/MF A01**
Jiangsu Inst. of Tech., Zhenjiang (China). Dept. of Agricultural Mechanization.
Stress-Strain-Time Graph of Rheological Soils and Its Application,
J. Z. Pan. Aug 84, 5p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p539-543.

The Burgers model and its modified form have generally been considered as the rheological model of clayey soils since 1950's through tests and analyses. Six samples of paddy soils from four provinces in South China have been collected and tested. The Burgers model is accepted as the general model of these clayey soils.

513,397
AD-P004 295/2/GAR PC **A02/MF A01**
Kyoto Univ. (Japan).
Quality Control in Soil Compaction by Behaviours of Exciter,
S. Hata, and K. Tateyama. Aug 84, 15p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p691-705.

Soil compaction is one of the most effective methods for soil stabilization and is performed in most earthworks of earth dams and road embankments, etc. However, because its quality control depends upon tests performed at only several points in the fields to estimate such factors as the dry density, water content and C.B.R., misjudgement can occur when judging the degree of soil compaction required.

513,398
PB85-133452/GAR PC **A05/MF A01**
American Embassy, Paris (France). Regional Technical Aids Center.
Glossary of the Soil Sciences (Glossaire de la Science des Sols),
C. E. Ferguson. 1984, 89p TECHNIQUES AMERICAINES SER-140, AID-PN-AAL-336
French/English and English/French Glossary.

A French/English and English/French glossary of terms currently used by soil scientists is presented for use by students specializing in agronomy and soil science and by translators of specialized documents. The glossaries are followed by a list of 200 English verbs and 200 French verbs frequently used in soil science.

513,399
PB85-136463/GAR PC **E05/MF E05**
Centre de Recherches Routieres, Brussels (Belgium).
Mode Operatoire: Determination des Modules Dynamiques des Sols par Resonance (Operating Mode: Determination of Dynamic Soil Modules by Resonance).
c1984, 54p MF-51/84
Text in French.

Determination of dynamic soil modules (complex modules of longitudinal deformation and shearing) by resonance means subjecting a cylindrical soil sample of known length and volume mass at its base to sinusoidal vibrations maintained longitudinally or in twist, of increasing frequency, and of measuring the resonance frequency for which the relation between acceleration amplitudes at the base and the top of the sample is minimal, and phase shift between these accelerations close to Pi/2. The test equipment consists of a triaxial cell fitted with vibrators, which produce separately longitudinal and twisting vibrations. The soil sample is kept in the given conditions of static effects. It is held between suction plates which make it possible to establish a definite suction and to measure it.

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

513,400
AD-A148 810/5/GAR PC **A08/MF A01**
Hughes Aircraft Co., Torrance, CA. Electron Dynamics Div.
Improved Materials and Processes of Dispenser Cathodes.
Final rept. 1 Apr 80-1 Apr 84,
R. T. Longo, W. F. Sundquist, and E. A. Adler. Aug 84, 168p EDD-W-09514, AFWAL-TR-84-4072
Contract F33615-80-C-5191

Several process variables affecting the final electron emission properties of impregnated dispenser cathodes were investigated. In particular, the influence of billet porosity, impregnant composition and purity, and osmium-ruthenium coating were studied. Work function and cathode evaporation data were used to evaluate cathode performance and to formulate a model of cathode activation and emission. Results showed that sorted tungsten powder can be reproducibly fabricated into cathode billets. Billet porosity was observed to have the least effect on cathode performance. Use of the 4:1:1 aluminate mixture resulted in lower work functions than did use of the 5:3:2 mixture. Under similar drawout conditions, the coated cathodes showed superior emission relative to uncoated cathodes. In actural Pierce gun structures under accelerated life test, the influence of impregnant sulfur is clearly shown to reduce cathode performance.

513,401
DE85000889/GAR PC **A02/MF A01**
Brookhaven National Lab., Upton, NY.
Critical Current Anistropy in NbTi Cables.
M. Garber, and W. B. Sampson. 1984, 4p BNL-35251, CONF-840937-15
Contract AC02-76CH00016
Applied superconductivity conference, San Diego, CA, USA, 9 Sep 1984.
Portions are illegible in microfiche products.

The short sample critical current of multifilamentary NbTi cables is usually measured in a magnetic field which is oriented perpendicular to the broad face of the cable. This is the same orientation that occurs at the equatorial turns of a cos theta type dipole magnet and is, therefore, usually specified in quality control short sample tests. It is generally found that the current density in cables is less than in wires. This degradation, as it is commonly called, may be as large as 15%. The effect is illustrated in a statistical way which shows the distribution of wire and cable results for the Colliding Beam Accelerator Project at BNL. The current densities were calculated using geometrical data given below. Some 200 cable and 750 wire tests are included in the normal curve distributions shown. The mean cable Jc is 14% lower than that of the wire. Similar results were obtained in previous work. In this note we present results of critical current measurements which are made with the applied magnetic field oriented parallel to the plane of the cable (still perpendicular to the direction of current flow) as well as perpendicular. It is found that the parallel critical current is generally larger than the perpendicular and is usually almost equal to that of the wires prior to cabling. The degradation is small for the parallel field orientation. (ERA citation 10:002943)

513,402
DE85001514/GAR PC **A02/MF A01**
Los Alamos National Lab., NM.
Development of Photoconductive Power Switch Technology. Progress Report, July 1, 1983-March 31, 1984.
W. C. Nunnally. Aug 84, 20p LA-10165-PR
Contract W-7405-ENG-36
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report describes the development of photoconductive power switch (PCPS) technology supported by the Air Force Weapons Laboratory (AFWL) during the last six months of CY 1983 and Los Alamos supporting research during the first six months of FY 1984. Carrier lifetime improvement, surface flashover reduction, uniform electric field geometries, and uniform optical illumination of the semiconductor surface are discussed. (ERA citation 10:001063)

513,403
DE85001904/GAR PC **A02/MF A01**
Sandia National Labs., Albuquerque, NM.
AlAs/GaAs Superlattice Barrier Unipolar Diode Structure.
T. J. Drummond, H. P. Hjalmarson, P. Pearah, and H. Morkoc. 1984, 4p SAND-84-1597C, CONF-841234-1
Contract AC04-76DP00789
International electron devices meeting, San Francisco, CA, USA, 10 Dec 1984.
Portions are illegible in microfiche products.

GaAs capacitor structures employing a thin undoped layer of (Al, Ga)As as a dielectric have been described and successfully used as gates in field effect transistors with transconductors exceeding 200 mS/mm at 77K. To improve the interface and bulk properties of the barrier, an AlAs/GaAs superlattice was substituted for the (Al, Ga)As. The I-V characteristics measured for the superlattice barrier structures had greatly reduced currents and a much larger degree of rectification than could be explained by conventional thermionic emission theory. A new theoretical model describing phonon-assisted emission provides a very good qualitative fit to the measured data. With the aid of this model we also find dramatic evidence for believing the conduction band offset in the AlAs/GaAs system is approximately 60% of the difference in the direct bandgaps. (ERA citation 10:003072)

513,404
DE85002726/GAR PC **A02/MF A01**
Argonne National Lab., IL.
Characterization of Nb-8 Wt % Al Wires by Analytical Electron Microscopy.
W. E. King, C. L. H. Thieme, and S. Foner. 1984, 5p CONF-840937-18
Contract W-31-109-ENG-38
Applied superconductivity conference, San Diego, CA, USA, 9 Sep 1984.

Analytical electron microscopic observations of longitudinal cross-sections of Nb-8 wt % Al powder metallurgy processed wire are presented. Grains were found of unreacted Nb, Nb-Al which was identified as A15 Nb-Al by convergent beam electron diffraction (CBED), and Nb-Al grains identified as Nb sub 2 Al by CBED. No unreacted Al is found. High resolution TEM views for each phase and for regions at the phase boundaries are also presented. Comparisons of the composition of arc melted Nb sub 3 Al are made with the low temperature P/M processed A15 phase. (ERA citation 10:002596)

513,405
DE85002729/GAR PC **A02/MF A01**
Argonne National Lab., IL.
Application of NbN Films to the Development of Very High Field Superconducting Magnets.
R. T. Kampwirth, D. W. Capone, K. E. Gray, and A. Vicens. Sep 84, 5p CONF-840937-17
Contract W-31-109-ENG-38
Applied superconductivity conference, San Diego, CA, USA, 9 Sep 1984.
Portions are illegible in microfiche products.

We report the preliminary results of a program recently begun at Argonne National Laboratory to demonstrate the feasibility of using niobium nitride (NbN) films as practical high field superconductors. Films of varying thicknesses (2 to 9 mu m) have been deposited on sapphire and Hastelloy substrates, using dc magnetron sputtering. The superconducting transition temperatures T/sub c/ of these films range from 11 to 15 exp 0 K. Using the WHH extrapolation, upper critical fields H/sub 2c/(0) up to 40 T in the parallel direction and 48 T in the perpendicular direction were obtained. Critical current densities J/sub c/(H,4.2 exp 0 K) were approx. = 1x10 exp 4 A/cm exp 2 at 20 T in both the parallel and perpendicular directions. The preliminary results from novel sample preparation technique for TEM studies of film cross-sections are briefly described. This technique shows the variation in film structure as a function of distance from the substrate. (ERA citation 10:002950)

513,406
PB85-136125/GAR
(Order as PB85-136117/GAR, PC **E05/MF E01**)
Mitsubishi Electric Corp., Tokyo (Japan).
Multi-Step-Focus Electron Gun for Mini-Neck Color CRTs,
E. Nosaka, K. Sano, and J. Takada. c1984, 3p
Text in Japanese.
Included in Mitsubishi Denki Giho, v58 n11 p1-3 1984.

Reducing the diameter of CRT necks is a necessary accompaniment to the current demand for miniaturized color TV sets with low power consumption. Thinner tube necks mean that thinner electron guns must be mounted in the neck, with smaller electron lens diameters, consequently degrading screen focus performance. The article introduces a multi-step focus electron gun developed and mass-produced by Mitsubishi Electric with focusing performance fully applicable for large-screen mini-neck color CRTs.

513,407
PB85-136166/GAR
(Order as PB85-136117/GAR, PC **E05/MF E01**)
Mitsubishi Electric Corp., Tokyo (Japan).
Optical-Fiber Penetration Devices,
T. Kojiro, and J. Takeda. c1984, 4p
Text in Japanese.
Included in Mitsubishi Denki Giho, v58 n11 p44-47 1984.

Optical communications use optical-fiber signal-transmission lines and optical-fiber penetration instead of conventional wire penetration. Optical-fiber penetration devices must be gastight and have low transmission losses, characteristics which must be guaranteed irrespective of ambient conditions. Mitsubishi Electric has developed two methods of optical-fiber penetration, which are introduced in the article: hermetically sealed and organic material sealed. Both provide excellent resistance to environmental factors, including heat, radiation, and seismic disturbance.

513,408
PB85-138014/GAR PC **E05/MF E04**
Centre d'Etudes et de Recherches de Toulouse (France). Dept. d'Etudes et de Recherches en Micro-ondes.

Propagation Guidee sur Barreaux Semi-Conducteurs en Gamme Millimetrique (Phase 2) (Guided Propagation on SemiConductor Bars in Millimeter Range (Phase 2)).
Final rept.,
P. Borderies, and B. Chan. Aug 84, 84p R-4/1277-MO
Text in French.

It is the objective of the contract to perfect a strict calculation program which makes it possible to determine the characteristic values of separate image guide, which can be used in the integrated subsets from 90 to 100 GHz. The first part shows the theoretical and mathematical development of the method of connecting applied fields with separate image guide. The second section deals with the development of the calculation program implemented to obtain constants for propagation, fields, losses and impedances. Convergence as a function of the number of basic functions and the distance to the fictitious superior metal plane is excellent. The double-layer guide presents dielectric and conducting losses less than the image guide and a different field distribution. The third section is a presentation and a mode of utilization of the logic attained at DERMO, which will be transferred to Thomson-DCM.

513,409
PB85-141018 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Stability and Thermal Quenches in Force-Cooled Superconducting Cables.
Final rept.,
V. D. Arp. May 79, 15p
Sponsored by Massachusetts Inst. of Tech., Cambridge. Francis Bitter National Magnet Lab.
Pub. in Proceedings of Superconducting MHD Magnet Design Conference, Cambridge, MA, Oct. 18-19, 1978, p142-156 May 79.

This paper describes the active heat transfer and hydrodynamic processes occurring when a cable-in-conduit superconductor is subjected to a localized, time dependent, thermal perturbation. The coupled partial differential equations describing the superconductor temperature and the helium pressure, temperature, and flow are integrated numerically for several practical geometries. The program can be used to predict both the stability limit and the subsequent quench behavior of the system. Comparison with existing multiple-stability data suggests that the predictions are close but further refinements in the heat transfer parameterization are necessary. Predicted quench behavior will be tested in experiments planned for late 1980.

513,410
PB85-142446 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Research Opportunities in Superconductivity.
Final rept.,
M. Tinkham, M. R. Beasley, D. C. Larbalestier, A. F. Clark, and D. K. Finnemore. Jul 84, 11p
Pub. in Cryogenics 24, p378-388 1984.

Opportunities for research in the field of superconductivity are identified in this report of a 'Workshop on Problems in Superconductivity' held at Copper Mountain, Colorado, August 22-23, 1983. Key problems in superconductivity, high payoff areas of research, barriers to progress, and the need for new facilities are outlined in the three areas of basic physics, materials, and devices.

513,411
PB85-143840 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Measurements of DC Electric Fields and Ion Related Quantities.
Final rept.,
R. H. McKnight. Jul 84, 28p
Pub. in Proceedings of Conference on Environmental Ions and Related Biological Effects, Philadelphia, PA., October 30, 1982, p34-61 Jul 84.

Measurement techniques developed by atmospheric scientists for characterizing the earth's electrical environment are useful for measuring various electrical parameters near high voltage dc (HVDC) transmission lines. Parameters of primary interest are the electric field, vertical current density, and polar space charge density. Other quantities which have been measured include conductivity, net space charge density and the mobility spectrum of ions making up the space charge. Errors associated with the various measurements are discussed, including those which result from the high electric fields and space charge densities existing near the lines. In addition, these measurement techniques are being used to characterize the operation of biological exposure systems.

513,412
PB85-144418 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Improved Device Physics for Calculating the Gain of Bipolar Structures in Silicon.
Final rept.,
H. S. Bennett. 1984, 5p
Pub. in The Physics of Submicron Structures, p307-311 1984.

A model which is more physically correct than the extension of the empirical procedures of Slotboom and de Graaff for donor densities above 2.5 x 10 to the 19th power/cc has been developed for the effective intrinsic carrier concentration in n-type silicon. This new approach, which is based upon quantum mechanics and optical measurements for the bandgap, has been applied to an npn transistor with a 1 micrometer emitter-base junction depth and with donor densities greater than 10 to the 20th power/cc. Conventional device physics with even unrealistic carrier lifetimes does not predict the measured dc common emitter gain. The approach described here with carrier lifetimes comparable to those expected in processed silicon (about 0.1 microsecond) does predict the gain correctly.

513,413
PB85-148120 Not available NTIS
National Bureau of Standards, Boulder, CO.
Microwave-Induced Constant-Voltage Steps at One Volt from a Series Array of Josephson Junctions.
Final rept.,
J. Niemeyer, J. H. Hinken, and R. L. Kautz. 15 Aug 84, 3p
Pub. in Applied Physics Letters 45, n4 p478-480, 15 Aug 84.

It is demonstrated that a series array of 1474 Josephson junctions can produce quantized voltages up to 1.2 V when driven by microwaves at 90 GHz in the absence of a dc bias. This result brings closer the possibility of a practical Josephson voltage standard at the 1-V level.

513,414
PB85-854172/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Semiconductor Packaging. 1970-January 1985 (Citations from the U. S. Patent Data Base).
Rept. for 1970-Jan 85.
Jan 85, 95p

This bibliography contains citations of selected patents concerning semiconductor packaging techniques. Methods of manufacturing thermal conduction elements, hermetic seals, and electrical connectors for semiconductor device packages are discussed. Shock, impact, vibration, and explosion resistant packages for semiconductor devices are considered. (Contains 127 citations fully indexed and including a title list.)

513,415
PB85-854495/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Charge Coupled Devices. 1970-January 1985 (Citations from the U. S. Patent Data Base).
Rept. for 1970-Jan 85.
Jan 85, 146p

This bibliography contains citations of selected patents concerning technology and applications of charge coupled devices (CCD). CCD imagers, memory circuits, registers, and filters are discussed. Defect correction, error analysis, and diagnostic testing methods of CCD systems are disclosed. CCD applications in signal processing and analog to digital conversion techniques are presented. (Contains 185 citations fully indexed and including a title list.)

9B. Computers

513,416
AD-A148 631/5/GAR PC **A03**/MF **A01**
Maryland Univ., College Park. Computer Science Center.
Texture Classification Using Gray Level Cooccurrence Based on Edge Maxima.
Technical rept.,
C. R. Dyer, T. H. Hong, and A. Rosenfeld. Mar 79, 41p Rept no. CSC-TR-738
Contract DAAG53-76-C-0138, DARPA Order-3206

Features based on the joint frequencies of occurrence of pairs of gray levels at given separations are often used for texture analysis. Recently, Davis et al. have suggested using joint occurrences of local maxima of a local property (e.g., edge maxima) to define texture features. This paper proposes a hybrid approach using joint gray level occurrences at and near edge maxima. This paper introduces a new class of texture features, based on the joint occurrences of gray levels at points defined relative to edge maxima. These features are compared with previous types of cooccurrence-based features, and experimental results are presented indicating that the new features should be useful for texture classification. Originator-supplied keywords include: Image processing, and Pattern recognition.

513,417
AD-A148 633/1/GAR PC **A10**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD. Computation, Mathematics and Logistics Dept.
Computer Center CDC Libraries/PROCFIL (Procedures).
Final rept.,
D. V. Sommer. Jun 84, 204p Rept no. DTNSRDC/CMLD-84-13

This reference manual describes all of the catalogued procedures (sets of control cards to accomplish a task) in Library PROCFIL on the CDC CYBER 170 computers at DTNSRDC. These procedures include document/source program/procedure file maintenance, program compilation/loading/execution, permanent file audit/rename copy functions. Clip/P lists the procedures by functional category and alphabetically with a descriptive title all machine-readable documents detailing the use of these procedures are included. (Author)

513,418
AD-A148 637/2/GAR PC **A02**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Validation of Computer Science Theories.
B. J. MacLennan. Nov 84, 18p Rept no. NPS52-84-021

We address normatively the demarcation problem for Computer Science: How can Computer Science research be conducted scientifically. First we attempt to delimit the subject matter of Computer Science, and conclude that it is not computers but programs. Since programs are not physical objects, it is difficult to see how they can be studied empirically. The rest of the paper is devoted to an explanation of how this can be done. This method is first illustrated by a hypothesis of narrow scope, analogous to a physical law. Next it is illustrated by a theory of wide scope - the Turing Machine model of computers. The approach is summarized in the conclusions.

513,419
AD-A148 680/2/GAR PC **A13**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD. Computation, Mathematics and Logistics Dept.
Computer Center CDC Libraries/Utility (Programs).
Final rept.,
D. V. Sommer. Jun 84, 288p Rept no. DTNSRDC/CMLD-84-14

This reference manual describes programs which are utilities such as tape and disk dumps, listers, selective copies, document generators/printers, card reformatter library maintenance. CLIB/U lists programs by functional category and alphabetically with a descriptive title. All machine readable documents detailing the use of these programs are included. (Author)

513,420
AD-A148 700/8/GAR PC **A02/MF A01**
Naval Research Lab., Washington, DC.
FLAD User's Manual: FLAD File Contents,
Memorandum rept.,
G. P. Mueller. 12 Dec 84, 12p Rept no. NRL-MR-5470

The Johns Hopkins University laser irradiation simulation code CLAD was converted to Fortran for use at NRL some years ago. The contractor, who renamed the code FLAD, left a series of tape files containing the new code. This report documents the location and contents of these files.

513,421
AD-A148 707/3/GAR PC **A03/MF A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
Proposal for a Small Scheme Implementation.
Interim rept.,
R. Schooler, and J. W. Stamos. Oct 84, 26p Rept no. MIT/LCS/TM-267
Contract N00014-83-K-0125

Scheme is a lexically scoped dialect of LISP developed at MIT. This report determines the feasibility of implementing a Scheme-based programming/application environment on a contemporary personal computer such as the Apple Macintosh. The absence of virtual memory, coupled with a limitation on the maximum amount of physical memory, means that space is at a premium. The use of bytecodes is suggested and a possible instruction set sketched. Because of space constraints, tail-recursion optimization and an efficient mechanism for the reclamation of inaccessible contexts are also examined. Using the built-in operating system and user interface of the Macintosh realizes speed, functionality, and friendliness but raises a number of interesting issues. For example, the Pascal and assembler routines make many assumptions about data representation, type checking, and parameter passing. Since an implementation of Scheme is likely to have radically different conventions, the two environments must be interfaced smoothly and efficiently. In addition to the bytecoded instruction set, the authors specify the virtual machine informally, discuss the implementation of basic and advanced features, estimate the performance of such an implementation, and finally evaluate the proposed design. (Author)

513,422
AD-A148 730/5/GAR PC **A05/MF A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
Partial Evaluation as a Means of Language Extensibility.
Master's thesis,
R. Schooler. Aug 84, 97p Rept no. MIT/LCS/TR-324
Contract N00014-83-K-0125

An optimization technique known as partial evaluation is explored. A partial evaluator optimizes code by making use of static information about program values. Our partial evaluator is designed to optimize mainly applicative code. Un-checked assertions are used to identify applicative constructs in the input code and guide the partial evaluator. Side-effects in the input code are retained but are not optimized. This thesis is part of a larger project devoted to language extensibility. Source language constructs will be transformed into kernel language constructs by syntactic transforms. These transforms will add applicative code for type-checking, etc. To assess the effectiveness of the partial evaluator, some examples of kernel language programs are partially evaluated, and the results discussed. Originator-supplied keywords include: Programming Language Optimization, Implementation, and Extensibility; and Partial Evaluation.

513,423
AD-A148 732/1/GAR PC **A04/MF A01**
General Research Corp., Santa Barbara, CA.
JOVIAL J73 Automated Verification System: Implementation Phase.
Final rept. May 80-Sep 83,
C. Gannon. Mar 84, 73p GRC-CR-9-947, RADC-TR-84-33
Contract F30602-79-C-0265

The JOVIAL J73 Automated Verification System (J73AVS), is an interactive computer program that analyzes any source code written in JOVIAL J73. The primary objective of J73AVS is to provide static and dynamic testing assistance. To do this, J73AVS detects a variety of semantic and data flow errors, reports execution coverage (i.e., frequency of statements, control branches, and procedures executed by each test case), reports execution timing (in terms of CPU milliseconds) for procedures or certain user-designated portions of the JOVIAL J73 program, reports execution tracing (ordering) of control branches or procedures, and keeps track of the test coverage history from run to run. To assist with function testing of programs, J73AVS provides a local assertion construct which triggers an output message when it is violated. J73AVS also provides a large number of source analysis reports, ranging from symbol cross references and descriptions of symbol usages to procedure calling trees and descriptions of all procedures being analyzed. These reports are useful for original code development, rehosting 'foreign' code, debugging and testing, code enhancement, and code maintenance. This report briefly describes the features of J73AVS and provides specific details on how to obtain the J73AVS software and selected project reports. Originator-supplied keywords include: Verification, and Software testing.

513,424
AD-A148 733/9/GAR PC **A04/MF A01**
SRI International, Menlo Park, CA. Computer Science Lab.
Representation and Refinement of Visual Specifications in PEGASYS.
Final technical rept. May 81-Feb 84,
M. S. Moriconi. Jun 84, 59p RADC-TR-84-128
Contract F30602-81-K-0176

This report describes techniques for the representation and refinement of visual specifications in the context of PegaSys (Programming Environment for the Graphical Analysis of SYStems), a system that supports a visual paradigm for the development and explanation of large software designs. Visual specifications are pictorial, mostly non-textual, descriptions of interactions among conceptual entities in a system design. Pictures have a computational meaning that is represented in a formal language, called the 'form calculus'. The form calculus is extensible in that it contains a core set of primitives which can be used to build a variety of abstract design models. Complexity is managed by means of picture hierarchies, whose construction is guided by a precise refinement methodology. The representation and refinement techniques presented have been implemented and all reasoning is fully automatic and efficient. Determining the validity of a picture refinement, for example, involves either the application of a single graph algorithm or the proof of a formula whose predictions range over small, finite sets. Excerpts from a sample session with PegaSys are used to illustrate a hierarchy of visual specifications. Originator-supplied keywords include: Computer programming, Logical representation, Interactive computer graphics, Program design methodology, and Design refinement.

513,425
AD-A148 750/3/GAR PC **A06/MF A01**
Naval Postgraduate School, Monterey, CA.
Design and Analysis of an Access Control System for a Multi-Backend Database System.
Master's thesis,
A. Ekici. Jun 84, 114p

This thesis describes the design and analysis of an access control mechanism for a multi-backend database system (MDBS). The MDBS utilizes a minicomputer as the controller and a number of minicomputers and their disk systems as the backends. The database is distributed over the dedicated disk systems of the backends. The operations on the database are performed by the backends in parallel. Thus, the performance gain of the system is dependent on the number of backends in the system. Each backend performs its own access control operations using duplicated access control information.

513,426
AD-A148 762/8/GAR PC **A03/MF A01**
Army Ballistic Research Lab., Aberdeen Proving Ground, MD.
Solid Geometric Modeling - The Key to Improved Materiel Acquisition from Concept to Deployment.
Memorandum rept.,
P. H. Deitz. Sep 84, 41p BRL-MR-3383, SBI-AD-F300 517
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

At its most abstract level, the business of materiel acquisition involves a massive task of information processing which starts with a concept and, if ultimately successful, ends with a deliverable. Most system analysts as well as program managers are aware that the key to increased productivity in such a complex process lies somehow in the application of automation. Some may view automation as the use of computer-aided drafting tools in a concept phase. Others might see it as computer-based system analyses of predictive performance or processor-controlled manufacturing procedures. Yet other observers may see word processing and electronic mail as centerpieces in the automated environment of the future. However, the real key to fundamental advances in the way materiel is concepted, analyzed, manufactured and delivered rests in our ability to describe and analyze geometry. By geometry we mean the complete and unambiguous mathematical definition of a system in three-dimensional space together with its complete material and functional properties, tolerances, etc. From this single unified model of a series of engineering analyses can be exercised to judge the suitability of a concept to a set of requirements before a prototype is built. Later this file can be used to automate the manufacturing process. In this paper the key role solid modeling can play in weapons engineering is discussed; in addition, examples of engineering analyses driven by solid modeling illustrate the capability such techniques bring to the materiel acquisition process.

513,427
AD-A148 769/3/GAR PC **A02/MF A01**
Naval Postgraduate School, Monterey, CA.
Steps Towards Parsing of Query Sequences to a Database,
N. C. Rowe. Oct 84, 17p Rept no. NPS52-84-015

Sequences of queries to a database system can have structure. Recognizing this structure is a kind of parsing , analogous to the parsing of sentences. We present two rather different approaches to recognition for exploitation. The first is a rule-based system that examines superficial aspects of a query sequence to postulate preferences between sets mentioned in the queries. The second is a deeper, but more limited model based on decision theory, which assigns utilities and suitability probabilities to individual set items, and attempts to explain set preferences on that basis. Both of these methods have disadvantages, and their performance is difficult to analyze because of the fuzzy nature of the application, but it is hoped they can form the basis for more comprehensive man-machine interfaces.

513,428
AD-A148 774/3/GAR PC **A03/MF A01**
Institute for Defense Analyses, Alexandria, VA.
Concept Paper for the Development of a DoD Ada (Trademark) Software Engineering Education and Training Plan.
Final rept.,
P. R. Jordan, C. W. McDonald, and B. Schaar. Nov 84, 26p IDA-M-7, IDA/HQ-84-28940, SBI-AD-E500 686
Contract MDA903-84-C-0031

The Ada Joint Program Office (AJPO) was established in December 1980, to manage the Department of Defense (DoD) efforts to implement, introduce, and provide life-cycle support for Ada. As part of this charter, it is the role of the AJPO to address Ada education and training. The goal of this document is to set forth the concepts necessary for Ada software engineering education and training. These concepts will result in an effective use of Ada in the shortest time possible to realize cost savings and achieve reliability and adaptability in computer software development. The full potential of Ada cannot be realized without appropriate education and training.

513,429
AD-A148 789/1/GAR PC **A03/MF A01**
Software Architecture and Engineering, Inc., Arlington, VA.
Unified Model for Performance and Reliability of Fault-Tolerant/Multi-Mode Systems.
Technical rept.,
V. G. Kulkarni, V. F. Nicola, and K. S. Trivedi. Nov 84, 35p CS-1984-12, AFOSR-TR-84-1094
Contract DAAG29-84-C-0045, Grant AFOSR-84-0132

This paper unifies different models and relates different performance and reliability measures that have

been proposed for the analysis of fault-tolerant computer systems. We model the changes in the structure of the system due to different events (such as degradation, failure or repair) as a continuous time Markov chain. In particular we consider the execution of a job on such a computer system where a service rate (or a reward rate) is associated with each structure-state. We allow different types of service-preemption interactions due to changes in the structure-state of the system. We derive the distribution of the completion time of a given job. Although the developed technique are suitable for the analysis of complex systems, we demonstrate their use through a simple switching server example.

513,430

AD-A148 792/5/GAR PC **A18**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD. Computation, Mathematics and Logistics Dept.
Computer Center CDC Libraries/NSRD (Subprograms).
Final rept.,
D. V. Sommer, and S. E. Good. Jun 84, 423p Rept no. DTNSRDC/CMLD-84-12

This document is a reference manual which describes most of the subprograms in libraries NSRDC and NSRDC5 on the CDC Cyber 170 computers at DTNSRDC. These scientific and utility routines are used primarily with Fortran programs and most are written in Fortran. CLIB/N lists the routines by functional category and alphabetically with a descriptive title. All available machine-readable documents detailing the use of these routines are included. (Author).

513,431

AD-A148 843/6/GAR PC **A11**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Automated Individual Training Record Management System (Prototype) United States Marine Corps.
Master's thesis,
R. E. Pruiett, and D. P. Haeusler. Mar 84, 234p

This thesis examines the feasibility of implementing an existing manual system, the Individual Training Record Management System, on a microcomputer. To demonstrate conceptual feasibility, a prototype is designed and implemented utilizing a commercially available database management system (DBMS). The prototype is not intended to be a fully operational system. Rather it provides an opportunity to demonstrate functions that could be fully implemented in similarly designed systems utilizing the basic criterial of simplicity, utility and low cost. (Author).

513,432

DE85000153/GAR PC **A04**/MF **A01**
Lawrence Livermore National Lab., CA.
Inter-Authentication-Domain (IAD) Logon Protocol (Preliminary Specification and Implementation Guide).
D. M. Nessett. 10 Oct 84, 60p UCID-30207
Contract W-7405-ENG-48

With the development of computer networking, it has become desirable for users to interact with hosts and distributed operating systems from terminals not directly connected to those systems. Users and the institutions for which they work require distributed interactive services to take advantage of specialized software and hardware as well as economically priced computing capacity. A classical example of this requirement occurs in the ARPANET and it is becoming more widespread as local networks are interconnected. The problem of providing distributed interactive services is complicated by the heterogeneity of the systems involved. This heterogeneity is a characteristic of both the systems themselves as well as of the protocols they support. The general problems of interconnecting such systems have been previously investigated from the perapective of providing distributed interprocess communication (CEKA74, SUNC77). The framework established by this work is used to discuss the specific problem of providing distributed interactive services. (ERA citation 10:004142)

513,433

DE85000418/GAR PC **A02**/MF **A01**
Stanford Linear Accelerator Center, CA.
AID: Access to Informal Documentation.
R. B. Chaffee. Aug 84, 5p SLAC-PUB-3422, CONF-8411110-1
Contract AC03-76SF00515
12. ACM special interest group on university and college computing services user conference, Reno, NV, USA, 11 Nov 1984.
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In many cases, access to stored information requires prior knowledge of the subject. It is a common joke among schoolchildren that to find the spelling of a word in a dictionary, you have to know how it is spelled. A similar problem affects the documentation for computer programs and operating systems: before you can use even the best documentation for the REPHALGAMIZE command, you have to know that it exists and applies to your situation. If rephalgamize is not a word that springs to mind, you may never discover the existence of that command. An experimental program which addresss this problem has been in use for the last four years on the large IBM timesharing system at the Stanford Linear Accelerator Center (SLAC). The program, called AID, has been enthusiastically received, and has generated some interesting questions as well as providing many suggestions and answers. (ERA citation 10:004138)

513,434

DE85000653/GAR PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Parallel Processing Experiences on the Denelcor HEP Computer.
A. H. Hayes. 1984, 14p LA-UR-84-3118, CONF-841242-2
Contract W-7405-ENG-36
International workshop on modelling and performance evaluation of parallel systems, Grenoble, France, 14 Dec 1984.
Portions are illegible in microfiche products.

Recent experiments conducted on a Denelcor HEP (Heterogeneous Element Processor) computer are discussed in this paper. Algorithm research was done on four types of problems of interest to the Los Alamos National Laboratory: (1) Monte Carlo, using GAMTAB, in which the interaction of photons with matter is analyzed; (2) Hydrodynamics; (3) Reactor Safety, in which the operation of a nuclear reactor is simulated; and (4) Particle-in-Cell, in which electrostatic interaction of plasma beams are studied. Means of maximizing programming efficiency are analyzed with ways of speeding up processing determined. (ERA citation 10:004134)

513,435

DE85002241/GAR PC **A02**/MF **A01**
Argonne National Lab., IL.
Cost Center RACF (Resource Access Control Facility) Administrator's Guide.
M. Thommes, N. Harrington, and F. Moszur. Aug 84, 14p ANL/TM-421
Contract W-31-109-ENG-38

This technical memorandum describes IBM's Resource Access Control Facility (RACF) at Argonne National Laboratory as it pertains to individuals who have been assigned the role of cost center RACF administrator. Cost center RACF administrators are designated to act as owners of MVS user IDs within a cost center. In this capacity, the RACF administrators can revoke and reinstate access to MVS for users in their cost center. This manual describes how and when cost center RACF administrators can use RACF commands. (ERA citation 10:004117)

513,436

DE85002344/GAR PC **A06**/MF **A01**
Los Alamos National Lab., NM.
Sixth Biennial CUBE (Computer Use by Engineers) Symposium.
Aug 84, 124p LA-10240-C, CONF-8410168-Absts.
Contract W-7405-ENG-36
Biennial computer use by engineers symposium (CUBE), Los Alamos, NM, USA, 10 Oct 1984.

This report presents the abstracts for the CUBE (Computer Use by Engineers) Symposium, October 10 through 12, 1984. Abstracts were contributed by Los Alamos, Lawrence Livermore, and Sandia National Laboratories. (ERA citation 10:004132)

513,437

DE85002431/GAR PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Single-Board 32-Bit Computer for the FASTBUS.
R. Kellner, J. P. Hong, and J. M. Blossom. 1984, 3p LA-UR-84-3403, CONF-841007-12
Contract W-7405-ENG-36
Nuclear science symposium, Orlando, FL, USA, 31 Oct 1984.

The Los Alamos National Laboratory is building a 32-bit computer on a FASTBUS board. It will use the National Semiconductor 32032 chip set, including the demand-paged memory management, floating point slave processor and interrupt control chips. The board will support 4 megabytes of memory which can be accessed by the processor over an on-board execution bus at processor speeds and which can be accessed by the FASTBUS at 80 megabytes per second. A windowed, direct memory access mechanism allows transfers of up to all of the memory. (ERA citation 10:004135)

513,438

DE85002654/GAR PC **A12**/MF **A01**
Argonne National Lab., IL.
DISPL1: A Software Package for One and Two Spatially Dimensioned Kinetics-Diffusion Problems.
G. K. Leaf, and M. Minkoff. Sep 84, 259p ANL-84-56
Contract W-31-109-ENG-38
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DISPL1 is a software package for solving some second order nonlinear systems of partial differential equations including parabolic, elliptic, hyperbolic, and some mixed types such as parabolic-elliptic equations. Fairly general nonlinear boundary conditions are allowed as well as interface conditions for problems in an inhomogeneous media. The spatial domain is one or two dimensional with Cartesian, cylindrical, or spherical (in one dimension only) geometry. The numerical method is based on the use of Galerkin's procedure combined with the use of B-splines in order to reduce the system of PDE's to a system of ODE's. The latter system is then solved with a sophisticated ODE software package. Software features include extensive dump/restart facilities, free format input, moderate printed output capability, dynamic storage allocation, and three graphics packages. (ERA citation 10:003649)

513,439

DE85002765/GAR PC **A02**/MF **A01**
Argonne National Lab., IL.
Personal Desktop Computing In a Research and Development Laboratory.
J. Schofield. 1984, 14p CONF-8411115-1
Contract W-31-109-ENG-38
National Institute for Management Research conference on personal computers in business, Chicago, IL, USA, 14 Nov 1984.
Portions are illegible in microfiche products.

This presentation describes the computing environment at Argonne National Laboratory and the management and technical actions underway to integrate personal desktop computers into a coherent hierarchy of computing systems connected through a heterogeneous file transfer network. We regard the arrival of personal desktop computers as both inevitable and beneficial, and we are pursuing policies to ensure that they are compatible with and complementary to the rest of the Laboratory's computing resources. Given the decentralized management of the Laboratory, the central Computing Services organization has relied almost exclusively on incentives - rather than controls - to channel the growth of personal desktop computers. These actions have actually strengthened the role of Computing Services in the laboratory and have provided experience through which we have learned new ways of serving and guiding computer users. (ERA citation 10:004125)

513,440

DE85900144/GAR PC **A03**/MF **A01**
Institute of Nuclear Energy Research, Lung-Tan (Taiwan).
Data Communication Software Interface Design for MACS/MCZ Microprocessor with PDP-11/60 Mini-Computer.
C. Y. Wang. Oct 83, 39p INER-0522
In English and Chinese.
U.S. Sales Only. Portions are illegible in microfiche products.

The microprocessor has become a very popular tool in laboratories and used in applications. It would be a valuable work if we could connect microprocessors to larger host computer to enhance the performance of a microprocessor. For example, the microprocessor can send raw data directly to a host computer for further analysis instead of using paper punches or tapes which are time-consuming and prone to err. The purpose of this report is to design a software data communication interface for MCZ to PDP-11/60 and MACS to MCZ. The design is based on RS232C hardware interface and ASCII standard code so that the same algorithm could be applied to other microprocessors. The algorithm has been implemented and proved on INER's Hybrid Computer Laboratory. (ERA citation 10:001693)

513,441
N85-12585/4/GAR PC **A03**/MF **A01**
National Aerospace Lab., Tokyo (Japan).
Program for Solution of BCMP Queueing Network Model.
K. Suematsu, and S. Hatayama. May 84, 27p NAL-TR-813
In Japanese; English Summary.

A program - called QNMAP - for solution of BCMP queueing networks with multiple closed and open subchains is described. For a given model, QNAMP computes average values of servers operating, queue length, queueing time and so on for all service centers and all classes of customers of each service center. Moreover, when analyzing the queueing network model of computer systems, the average values of TSS command response time and batch job elapsed time are computed. Numerical results for model of computer systems are shown.

513,442
N85-12607/6/GAR PC **A09**/MF **A01**
Centre National d'Etudes Spatiales, Toulouse (France).
Experimentation de l'Ateller Ada de Rolm en Phase de: Specification, Conception (Experimenting with the Rolm Ada Language Workshop for Specifying and Designing).
M. Cousergue, and M. Pellizzari. Jun 84, 186p
Text in French. Presented at Dess Training Session, Toulouse.

The utilization of Ada Language in specifying and designing large real time computer programs for space studies applications is discussed. Comparison with languages such as SADT for specifications and PDL for designing, are made. The Ada development environment is presented theoretically and as a quality analysis. It is shown that Ada is not acceptable for program specifications, but quite adequate for designing.

513,443
N85-12609/2/GAR PC **A03**/MF **A01**
Oxford Univ. (England).
CONTROL: A Suite of Interactive Transfer-Function Analysis Programs.
D. W. Clarke. 1984, 38p OUEL-1527

FORTRAN programs runnable on DEC VAX and PDP11 computers for graphical analysis of single-input/single-output feedback systems specified as transfer-functions are describe. Plotting programs for Nyquist and Bode frequency-response graphs, for root-locus diagrams and for step-responses of open and closed-loop plant are outlined. The plant can be combined with an optional and separately specified controller. The programs can operate with plant models which include dead-time. Programs implement the Routh-Hurwitz stability test and simplify models to obtain a reduced-order representation. At each stage a list of mnemonic options is automatically displayed. On option is always the mnemonic for help and, if selected, an explanatory list of the meanings of all current options is produced. The use of a command-driven interactive language means that proposed control systems can be rapidly and effectively assessed.

513,444
PB85-136109/GAR
(Order as PB85-136042/GAR, PC **E05**/MF **E01**)
Mitsubishi Electric Corp., Tokyo (Japan).
High-Speed High-Density 256K-bit MASK ROM,
R. Matsuo, H. Harima, M. Shimazaki, H. Takahashi, and T. Hata. c1984, 3p
Text in Japanese.
Included in Mitsubishi Denki Giho, v58 n10 p59-61 1984.

In recent years, EPROMs have come into widespread use as the ROMs for electronic equipment produced in small volumes but in a large number of variants, and in electronic equipment at the development stage. On the other hand, mask ROMS have cost advantages for a single pattern of electronic equipment used in large quantities, because their memory content needs no programming. Mitsubishi Electric has developed a 256K-bit mask ROM read-compatible with a 256K-bit EPROM by combining state-of-the-art techniques for the fine fabrication and low-power, high-speed circuit design. The article introduces this mask ROM with its circuit configuration and operating characteristics.

513,445
PB85-136414/GAR PC **A09**/MF **A01**
Indiana Univ. at Bloomington. Center for Transit Research and Management Development.
Microcomputers in Transit: A Software Handbook. Final rept.,
E. Wyatt, and G. Smerk. Jul 84, 189p UMTA-IN-11-0009-84-2
Grant DOT-UMTA-IN-11-0009
See also PB85-113660.

This handbook introduces management and staff of small to medium sized transit agencies to the use of microcomputers in transit operations. It describes the types of computer programs of use in this industry, and documents applications of some common ones. The handbook is in two parts. Part I describes a process for identifying appropriate use of microcomputers, and introduces the various types of computer programs. Chapter 1 introduces the components of the microcomputer system. Chapter 2 outlines a process for identifying worthwhile and feasible uses of a microcomputer in the agency by reviewing the various tasks which are candidates for automation. The following 5 chapters introduce different types of programs by describing their use and things to look for in selecting a program. Chapter 3 discusses generic software, including spreadsheets, database managers and word processors. Chapter 4 describes application software programs written to accomplish a particular task in the transit industry. Chapters 5, 6, and 7 concern operating systems, programming languages and utility programs respectively. Finally, Chapter 8 discusses some considerations in introducing a microcomputer into the agency. Part II documents applications of generic programs, primarily spreadsheets, in the transit industry. Each application is illustrated, and documented with notes permitting reconstruction of the application by new users. This handbook is a companion document to Microcomputers in Transit: A Hardware Handbook.

513,446
PB85-136455/GAR PC **E04**/MF **E01**
Canterbury Univ., Christchurch (New Zealand). Dept. of Electrical and Electronic Engineering.
Man - Machine Studies, Progress Report UC-DSE/25(1984),
J. H. Andreae. c1984, 71p
See also PB84-161017.

This report is comprised of a single paper 'Towards a Language for a Learning System.' It examines a number of aspects of transition networks and ordered sets as they relate to language. The central theme is the development of a parallel productions system to implement the principles of sentence analysis. A range of language related issues are covered: simplifying recursion, overcoming non-determinism, coping with multiple networks, representing sentence structure, and applying ordered set theory.

513,447
PB85-138386/GAR PC **E04**/MF **E04**
National Physical Lab., Teddington (England). Div. of Information Technology and Computing.
Gateway Testing Techniques,
H. X. Zeng, and D. Rayner. c1984, 26p NPL-DITC-49/84

In the past four years the NPL Protocol Standards Group and several other groups internationally have been working on testing protocol implementations. This work has concentrated on testing end-systems, that is computer systems which are attached to a single network. This report, by contrast, concentrates on gateways, that is computer systems which interconnect two or more networks. Three gateway testing techniques and the differences from end-system testing are discussed. A system is introduced for testing gateways which operate on an interim UK protocol, similar to the ISO X.25 convergence protocol, making the work applicable to Network Relays in Open Systems Interconnection (OSI). (Copyright (c) Crown copyright 1984.)

513,448
PB85-138766/GAR PC **E04**/MF **E04**
Science and Engineering Research Council, Chilton (England). Rutherford Appleton Lab.
Report on the IOTA Programming System and Other Japanese Advanced Research,
C. P. Wadsworth. c1984, 57p RAL-84-090

The main purpose of the trip was to become familiar with the IOTA programming system, developed by Professor Reiji Nakajima and his research group at Kyoto University, and to explore the possibilities for obtaining IOTA for the UK academic community. Nakajima had contacted other Japanese researchers interested in functional programming, specification and verification, and fifth generation systems, in advance of my visit and was instrumental in arranging discussion meetings and visits to four research groups during a two-day side-trip to Tokyo. The discussions included: History, People, Outline of IOTA, General discussion, Overall assessment of IOTA, Versions of IOTA. (Copyright (c) Science and Engineering Research Council 1984.)

513,449
PB85-139087/GAR PC **E03**/MF **E03**
Cambridge Univ. (England). Dept. of Engineering.
Mobile Jacobi Schemes for Parallel Computation,
J. J. Modi, and J. D. Pryce. 1984, 16p CUED/F-CAMS/TR-242
Prepared in cooperation with Bristol Univ. (England).

Parallel computers (such as the Distributed Array Processor (DAP) and Systolic Arrays) bring into consideration the Jacobi method where several non-interacting rotations can be performed simultaneously. However, the design of the algorithm is much more crucial in a parallel environment; inefficiencies can lead to considerable organizational costs. This paper provides a general framework for the description of mobile schemes together with two specific schemes, the better of which reduces the organizational overheads for the Jacobi method to zero.

513,450
PB85-139103/GAR PC **E03**/MF **E03**
Cambridge Univ. (England). Dept. of Engineering.
Some Problems of Exploiting a Pipeline Processor,
J. J. Modi, and J. S. Rollett. 1984, 12p CUED/F-CAMS/TR-240
Prepared in cooperation with Oxford Univ. (England).

This paper discusses the design of parallel algorithms in general and shows that using the low level language APAL it is possible to gain a significant speed up over the Mathlib routines provided by the manufacturers. However in order to achieve this it is necessary to perform floating-point addition, floating-point multiplication and fixed-point arithmetic as well as accessing operands to and from the main data storage, all in parallel. Furthermore there are certain restrictions on the inputs to the arithmetic units, which make it difficult to exploit the arithmetic speed of the machine fully.

513,451
PB85-139509/GAR PC **E04**/MF **E04**
Science and Engineering Research Council, Chilton (England). Rutherford Appleton Lab.
CCOPY: A File Supply and Text Plant Utility on the R.A.L. (Rutherford Appleton Laboratory) HEP VAX Computers,
M. Waters. c1984, 29p RAL-84-109

CCOPY is a program for copying and concatenating text files. The utility also provides facilities for dynamically 'planting' text strings at any point and to 'supply' files within files to any depth. (Copyright (c) Science and Engineering Research Council, 1984.)

513,452
PB85-139566/GAR PC **E04**/MF **E04**
Newcastle upon Tyne Univ. (England). Computing Lab.

Newcastle Connection: A Software Subsystem for Constructing Distributed UNIX Systems.
Technical report series,
B. Randell. c1984, 27p TRS-194
Presented at CERN School of Computing, Aiguablava, Spain, 9-22 September, 1984.

The Newcastle connection is a software subsystem that can be added to each of a set of physically interconnected UNIX or UNIX look-alike systems, so as to construct a distributed system which is functionally indistinguishable at both the user and the program level from a conventional single-processor UNIX system. The techniques used are applicable to a variety and multiplicity of both local and wide area networks, and enable all issues of interprocessor communication, network protocols, etc., to be hidden. A brief account is given of experience with such distributed systems, the first of which was constructed in 1982 using a set of PDP 11s running UNIX Version 7, and connected by a Cambridge Ring - since this date the Connection has been used to construct distributed systems based on various other computers and versions of UNIX, both at Newcastle and elsewhere. The final sections compare our scheme to various precursor schemes and discuss its potential relevance to other operating systems. (Copyright (c) 1984, University of Newcastle upon Tyne.)

513,453
PB85-141497 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Guide to Better Software.
Final rept.,
D. R. Wallace. Oct 84, 4p
Pub. in Government Data Systems 13, n5 p40-43 Sep/Oct 84.

The 'Guideline for Lifecycle Validation, Verification, and Testing of Computer Software' presents a methodology to be used throughout the software lifecycle to ensure the production and maintenance of quality software. The guideline suggests a combination of verification and testing techniques to arrive at recommended level of validation, verification, and testing tailored to the needs of a specific project. The guideline is a basic reference addressed to managers, developers, verifiers, maintainers, and end users.

513,454
PB85-142297 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
National Bureau of Standards and the National Standard Reference Data System.
Final rept.,
H. J. White. 1981, 5p
Pub. in AIChE Symposium Series 77, n203 p39-43 1981.

The National Standard Reference Data System was conceived as a decentralized national effort to provide critically evaluated reference data to the scientific and technical communities of the United States. Financial support and execution were expected to involve a variety of Government and private agencies. NBS was made responsible for overall planning and coordination. The Office of Standard Reference Data is the program management office within NBS. The current program in the National Standard Reference Data System and the activities of the Office of Standard Reference Data are reviewed briefly with emphasis on those activities which appear to be of particular interest to chemical engineers.

513,455
PB85-143550 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Security in Computer Communication Systems.
Final rept.,
H. M. Wood, and I. W. Cotton. 1983, 41p
Pub. in Computer Communications, Volume 1: Principles, p369-409 1983.

The growing recognition of the need for computer and communications security has resulted in the design, development, and installation of 'patches', packages, and even new operating systems intended to provide higher degrees of data and systems protection. With the increased utilization of computer networks and current developments in the area of network operating systems the requirements for security in networking environments are also coming under investigation. While research and development are still ongoing in the area, it is vital to ensure that requirements for the security and integrity of data are well specified and that mechanisms for achieving the needed levels of systems protection are included in the design of networking systems. This chapter reviews methods and mechanisms that may be used to achieve required degrees of computer network security. Such methods include those aimed primarily at communications security (e.g., data encryption techniques), as well as access control techniques (e.g., authentication an authorization checking), physical security, and procedural controls. Emphasis is placed on those aspects of security that particularly relate to the communications environment in computer networks. Many references to the open literature are included in order to guide the interested reader into the rapidly growing area of computer communications security.

513,456
PB85-145217 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
User-Oriented Data Communication Performance Parameters.
Final rept.,
D. S. Grubb, M. D. Abrams, and N. B. Seitz. 1981, 10p
Pub. in Proceedings of International Conference, Paris, France, September 14-16, 1981, Performance of Data Communication Systems and their Applications, p145-154.

This paper is a discussion of a newly developed set of parameters that define data communication performance from an end user viewpoint and in system independent terms. The parameters are the subject of a proposed American National Standard. Where possible, actual text from the proposed standard is used.

513,457
PB85-145225 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Authentication Using the Federal Data Encryption Standard.
Final rept.,
M. E. Smid. 1981, 6p
Pub. in Proceedings of Natl. Electronics Conference, Chicago, IL., O ctober 26-28, 1981, v35 p296-301.

The Federal Data Encryption Standard (DES) cryptographic algorithm can be used to authenticate the integrity of data by detecting unauthorized modifications. DES authentication algorithms are similar to those for data encryption, but authentication algorithms permit data to be transmitted or stored in an unencrypted form. Authentication algorithms differ from error detecting codes in that authentication algorithms detect intentional modifications as well as accidental alterations. These algorithms have several communications and data storage applications.

513,458
PB85-145258 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
NBS (National Bureau of Standards) Calibration Service for A/D and D/A Converters.
Final rept.,
T. M. Souders, and D. R. Flach. 1981, 14p
Pub. in Proceedings of Digest of Papers - International Test Conference, Philadelphia, PA., October 27-29, 1981, IEEE (Institute of Electrical and Electronics Engineers) Cat. No. 81-CH1957-0, p290-303.

An NBS calibration service for high performance 12- to 18-bit analog-to-digital converters (ADC's) and digital-to-analog converters (DAC's) is described. The service offers comprehensive measurements of linearity, differential linerity, gain, offset, and rms input noise (for ADC's), with systematic uncertainties as low as 3 ppm. Measurements are made at a minimum of 1024 different codewords. The measurement approach, design features, test programs, and data reduction techniques are discussed as are the methods of error estimation and quality control.

513,459
PB85-147957 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Observations on Data Element Naming Conventions.
Final rept.,
J. J. Newton. 1984, 5p
Pub. in Proceedings of Trends and Applications 1984, Making Database Work, Gaithersburg, MD., May 23-24, 1984, p153-157.

Data element naming conventions are an increasing concern of data administrators. Names in the past have been based on two differing philosophies of data organization. Three systems which have been used provide a basis of discussion; the issue of software independence must also be considered. Some rules for good names can be defined as a contribution to the establishment of naming conventions.

513,460
PB85-854255/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
CP/M Operating System. December 1982-1984 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for Dec 82-1984.
Jan 85, 241p
Supersedes PB84-858026.

This bibliography contains citations concerning the design, applications, and implementation of the widely used Control Program for Microprocessors, CP/M. Included are references to CP/M software, with the utility programs, text processors and editors, graphics systems, and associated peripheral device control programs. Some articles compare CP/M with other operating systems, and discuss the advantages and capabilities of each. (This updated bibliography contains 356 citations, 109 of which are new entries to the previous edition.)

513,461
PB85-854271/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
ADA Programming Language. March 1983-1984 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for Mar 83-1984.
Jan 85, 248p
Supersedes PB84-856749.

This bibliography contains citations concerning the high order programming language ADA. The abstracts reference reports on the design, implementation, grammar, compilers, and programming methodology for ADA. Many references pertain to microcomputers designed to use ADA, and other references discuss implementation problems. Many examples are given for using ADA in real-time programming, or multiprogramming applications. (This updated bibliography contains 348 citations, 214 of which are new entries to the previous edition.)

513,462
PB85-854420/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Portable Microcomputers. 1976-January 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1976-Jan 85.
Jan 85, 143p
Supersedes PB84-860642.

This bibliography contains citations concerning portable microcomputers, and their advantages and drawbacks. Topics include equipment reviews, projected markets, and applications. Peripheral equipment, and software availability and utilization are also discussed. (This updated bibliography contains 215 citations, 95 of which are new entries to the previous edition.)

513,463
PB85-854545/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Microcomputers: Data and Software Security. 1974-January 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1974-Jan 85.
Jan 85, 60p
Supersedes PB84-858224.

This bibliography contains citations concerning management aspects, and available hardware and software used to protect against data access and piracy. The utilization of the microcomputer to access larger systems, and the security of data and software used in microcomputer systems are among the topics consid-

ered. (This updated bibliography contains 74 citations, 12 of which are new entries to the previous edition.)

513,464
PB85-854669/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Computer Programming Languages for Numerical Control. 1972-1984 (Citations from the Engineering Index Data Base).
Rept. for 1972-1984.
Jan 85, 200p
Supersedes PB84-860238.

This bibliography contains citations concerning computer programming and languages to generate data for control of machine tools. These software routines apply to numerically controlled machines used for shaping, punching, and cutting. Some of the referenced literature addresses special programming languages for three axis machine tools, flexible production, and temperature compensation for tool location. The emphasis in this bibliography is on developed languages and systems, although there are also many abstracts on design principles to aid in developing an appropriate language. (This updated bibliography contains 312 citations, 71 of which are new entries to the previous edition.)

513,465
SHR-0012170/GAR PC **A06**/MF **A01**
Denver Research Inst., CO. Social Systems Research and Evaluation Div.
Board and Care for Elderly and Mentally Disabled Populations: Documentation of Microdata Tapes,
G. P. Smith, C. B. C. Jones, and N. D. Dittmar. Mar 83, 113p
Contract DHHS-100-79-0117
See also SHR-0010583.

This volume provides documentation for users of the microdata tapes of the evaluation of board and care homes. The tapes are described as being unlabeled, and with 6250 bits per inch. There are two types of tapes: facility and resident. Each item of data contained in the two types of tape is described (e.g., resident assessment, behavioral checklist, and family interview). Data are arranged sequentially according to their physical location on the tape record. The variables are referenced by a field name, the tape positions, formats, and descriptions of the questions and their contents. Some computer-generated data items are included on each of the files (e.g., the age of the resident at the time of the interview).

9C. Electrical and Electronic Engineering

513,466
PB85-149763/GAR PC **A06**/MF **A01**
Energy and Environmental Analysis, Inc., Arlington, VA.
Cost Comparison of Small Gas Turbines Versus Electric Motors in a Variable Load Industrial Application.
Topical rept. Aug 83-Jul 84,
T. M. Desai, and S. Y. Salama. Jul 84, 106p GRI-84/0156
Contract GRI-5082-512-0622

Equipment such as pumps and blowers can save a substantial amount of energy when operated at part-loads with a variable speed drive in comparison to the conventional technology of using a constant speed drive and a throttle valve. This report compares gas turbines and electrical motors, with and without variable frequency speed controller, for one such industrial application. The application characteristics are developed after reviewing the published population data for motors and gas turbines. Two types of gas turbines, simple cycle and regenerative cycle, and three types of motors, standard, high efficiency, and high efficiency with variable frequency speed controller, are considered. The total life-cycle costs of these five prime movers are compared for three scenarios with varying extent of part-load operations. The relative importance of each cost component is evaluated based on this evaluation. The effect of turbine exhaust utilization is addressed parametrically to demonstrate this additional benefit from gas prime movers.

513,467
PB85-854214/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Phase Locked Loop. May 1970-January 1985 (Citations from the NTIS Data Base).
Rept. for May 70-Jan 85.
Jan 85, 200p
Supersedes PB84-858588.

This bibliography contains citations concerning the theory, design, testing, development, performance characteristics, and applications of various phase locked loop circuits and devices. Topics include stability analysis and control systems for phase locked loops, frequency synthesizers and estimators, phase detectors, and phase locked loop modulation and demodulation. (This updated bibliography contains 244 citations, 65 of which are new entries to the previous edition.)

9D. Information Theory

513,468
AD-A148 770/1/GAR PC **A02**/MF **A01**
University of Southern California, Los Angeles. Dept. of Electrical Engineering.
Algebraic Structure of Convolutional Codes with Application to Code Construction and Decoding.
Quarterly rept. (Interim) 7 Jan-30 Sep 84,
I. S. Reed. Oct 84, 22p
Contract F49620-84-C-0069

During this quarter, the error trellis syndrome decoding techniques for convolutional codes was developed. This algorithm is specialized then to the entire class of systematic convolutional codes. Finally, this algorithm is applied to the high rate Wyner-Ash convolutional codes. A special example of the one-error-correcting Wyner-Ash code, a 3/4 rate code is treated in this report. (Author)

513,469
N85-12291/9/GAR PC **A02**/MF **A01**
Ecole Nationale Superieure des Telecommunications, Paris (France).
Linear Intersecting Codes.
G. Cohen, and A. Lempel. Apr 84, 15p ENST-C-84002
Submitted for Publication. Presented at IEEE Intern. Symp. On Inform. Theory, St. Jovite, Canada, 26-30 Sep. 1983.

Pairs of binary linear codes C1(n,nR1), C2(n,nR2) with the property that any nonzero C1 is a member of the set C1 and C2 is a member of the set C2, there being a coordinate in which both C1 and C2 are nonzero, are studied. Results are applied to message synchronization in common channel communication.

9E. Subsystems

513,470
AD-A148 775/0/GAR PC **A05**/MF **A01**
Mission Research Corp., Albuquerque, NM.
PNPN Latchup in Bipolar LSI Devices.
Final rept. 1 Jan 80-1 Oct 81,
R. L. Pease, and D. R. Alexander. 1 Jan 82, 95p AMRC-R-331, DNA-6164F, SBI-AD-E301 535
Contract DNA001-80-C-0140

PNPN latchup was studied both analytically and experimentally in several bipolar LSI technologies including integrated injection logic (I to the second power L), integrated Schottky logic (ISL), Schottky Transistor logic (STL) and emitter coupled logic (ECL). The latchup analysis procedure was expanded and applied to LSI microcircuits representing each of the technologies. This procedure consists of a) the identification of parasitic PNPN paths, b) the electrical characterization of the paths, c) detailed circuit analysis, and d) determination of worst case bias conditions for radiation testing. The identification was performed from chip photomicrographs and composite mask drawings. The characterization was performed experimentally by measuring parasitic transistor gains and SCR parameters on decoupled paths and analytically by using a semiconductor device physics code (PN code) in conjunction with doping profiles. The detailed circuit analysis was performed either by hand or with the circuit analysis code SPICE. Radiation testing was performed at the White Sands Missile Range LINAC facility. The results of the study were, a) latchup cannot occur in non-isolated I to the second power L, b) latchup cannot occur in the internal logic of ISL or STL without causing a problem with electrical performance, c) no latchable paths were found by analysis in the 93471 ECL 4kK RAM, the I/O buffers on a ISL/STL gate array or the I to the second power L peripherals of the 9408 I to the 3rd power L microprogram sequencer.

513,471
N85-12295/0/GAR PC **A03**/MF **A01**
Forschungsinstitut der Deutschen Bundespost, Darmstadt (Germany, F.R.).
Influence of Strut Cross-Section on Strut Radiation of Reflector Antennas.
V. Hombach. Jun 84, 43p FI-455-TBR-39
In German; English Summary.

The sidelobe level of rotationally symmetric paraboloid antennas is studied. The influence of the strut cross-section on the scattering behavior was investigated. Results indicate that struts of circular and elliptical cross-section produce only a small scattered field in the backward region while lattice-type struts cause high-level sidelobes.

513,472
N85-12300/8/GAR PC **A09**/MF **A01**
TRW Electronic Systems Group, Redondo Beach, CA.
30 Ghz Solid State Amplifier for Low Cost Low Data Rate Ground Terminals.
Final Report, Jun. 1982 - Jun. 1984.
Y. C. Ngan, and M. A. Quijije. Sep 84, 189p NAS 1.26:174795, REPT-4-9-T-10-F, NASA-CR-174795
Contract NAS3-23266

This report details the development of a 20-W solid state amplifier operating near 30 GHz. The IMPATT amplifier not only met or exceeded all the program objectives, but also possesses the ability to operate in the pulse mode, which was not called for in the original contract requirements. The ability to operate in the pulse mode is essential for TDMA (Time Domain Multiple Access) operation. An output power of 20 W was achieved with a 1-dB instantaneous bandwidth of 260 MHz. The amplifier has also been tested in pulse mode with 50% duty for pulse lengths ranging from 200 ns to 2 micro s with 10 ns rise and fall times and no degradation in output power. This pulse mode operation was made possible by the development of a stable 12-diode power combiner/amplifier and a single-diode pulsed driver whose RF output power was switched on and off by having its bias current modulated via a fast-switching current pulse modulator. Essential to the overall amplifier development was the successful development of state-of-the-art silicon double-drift IMPATT diodes capable of reproducible 2.5 W CW output power with 12% dc-to-RF conversion efficiency. Output powers of as high as 2.75 W has been observed. Both the device and circuit design are amenable to low cost production.

513,473
PB85-136158/GAR
(Order as PB85-136117/GAR, PC **E05**/MF **E01**)
Mitsubishi Electric Corp., Tokyo (Japan).
High-Density Packaging Technology,
M. Takada, H. Takasago, M. Takehara, H. Sugiura, and M. Goto. c1984, 4p
Text in Japanese.
Included in Mitsubishi Denki Giho, v58 n11 p26-29 1984.

To meet the demand for increasingly high-performance electronic equipment, three-dimensional high-density packages have been achieved by combining several high-density planar printed-circuit boards into multilayer modules. The packages use thick-film resistors optimized by the Mitsubishi Multi 16 personal computer and solder paste chip-component mounting on both sides of the boards. The article discusses the reliability of thick-film hybrid ICs and describes high-density packaging technology citing modular examples.

513,474
PB85-136174/GAR

(Order as PB85-136117/GAR, PC E05/MF E01)
Mitsubishi Electric Corp., Tokyo (Japan).
Functions and Features of the M74ALSOOP Series of Advanced Low-Power Schottky TTL Devices,
Y. Nakai, Y. Hirata, and T. Koyama. c1984, 6p
Text in Japanese.
Included in Mitsubishi Denki Giho, v58 n11 p48-53 1984.

Low-power Schottky TTL (LSTTL) ICs predominate in current standard logic IC production. The advanced LSTTL (ALSTTL) IC is its urgently awaited successor. Compared to conventional Mitsubishi LSTTL ICs with an average propagation time per gate of 6ns and a power consumption per gate of 2mW, the new ALSTTL ICs offer an average propagation time of 4ns and a power consumption of 1.2mW. The article introduces the structural design, basic circuit design, electrical characteristics, and package dimensions, and discusses reliability of this new device.

513,475
PB85-137263/GAR PC E03/MF E03
Institut Franco-Allemand de Recherches, Saint-Louis (France).
Conception et Realisation d'un Generateur d'Impulsions Haute Tension de 1,5 MV (Concept and Execution of a High-Voltage Pulse Generator of 1.5 MV),
F. Hatterer, and F. Jamet. 20 Dec 83, 24p N-615/83
Text in French, summaries in French and German.

Based on the techniques usually employed in the ISL, a high-frequency pulse generator was developed for 1.5 MV. It operates on the principle of multiplying the charge voltage by series switching of condensers. A theoretical investigation of the generator shows that the voltage loss through disturbance capacities can be neglected only when the ratio disturbance capacity/capacity per stage amounts to less than 0.0002. In view of this condition, the generator built furnishes a voltage pulse of 1.4MV with a discharge capacity of 240 pF and an energy of 270 J. In conjunction with a flash X-ray tube, the X ray radiation measured at a 1-m distance amounts to 160 mR, pulse duration to 30 ns and the apparent source diameter to 8 mm. The effective energy of X-ray radiation lies at approximately 400 keV.

513,476
PB85-142933 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Role of Test Chips in Coordinating Logic and Circuit Design and Layout Aids for VLSI.
Final rept.,
M. G. Buehler, and L. W. Linholm. 1981, 7p
Pub. in Solid State Technology 24, n9 p68-74 Sep 81.

The paper emphasizes the need for multipurpose test chips and comprehensive procedures for use in supplying accurate input data to both logic and circuit simulators and chip layout aids. It is shown that the location of test structures within test chips is critical in obtaining representative data, because geometrical distortions introduced during the photomasking process can lead to significant intrachip parameter variations. In order to transfer test chip designs quickly, accurately, and economically, a commonly accepted portable chip layout notation and commonly accepted parametric tester language are needed. In order to measure test chips more accurately and more rapidly, parametric testers with improved architecture need to be developed in conjunction with innovative test structures with on-chip signal conditioning.

513,477
PB85-142966 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Transients in a Resistively Loaded Loop Antenna.
Final rept.,
M. Kanda. Oct 84, 5p
Pub. in Proceedings of International Symposium on Electromagnetic Compatability, Tokyo, Japan, October 16-18, 1984, IEEE (Institute of Electrical and Electronics Engineers) Cat. No. 84-CH2097-4, p286-290.

Transient characteristics of a loop antenna loaded uniformly with a resistive material are analyzed. The current distribution of the antenna is obtained by the use of the Fourier series expansion technique. It is found that the distortion of the transient waveforms due to a resonance of a loop antenna can be reduced and the received transient waveforms can be tailored by resistive loading.

513,478
PB85-143592 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Characteristics of Iris-Fed Millimeter-Wave Rectangular Microstrip Patch Antennas.
Final rept.,
M. Kanda, D. C. Chang, and D. H. Greenlee. 1982, 3p
See also PB84-134634.
Pub. in Proceedings of Antennas and Propagation Society Symposium, Albuquerque, NM, May 24-28, 1982, IEEE Catalog No. 82-CH1783-0, p293-295.

This paper describes the characteristics of iris-fed millimeter-wave rectangular microstrip patch antennas. A theoretical model is given to describe the iris-fed patch antenna based on aperture coupling to cavities. The impedance and antenna power patterns are given.

513,479
PB85-148013 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Arrays of Discrete Elements.
Final rept.,
M. T. Ma. 1984, 34p
Pub. in Antenna Engineering Handbook, Second Edition, Chapter 3, p3 -1--3-34 1984.

This is an invited contribution, as Chapter 3, to Second Edition, Antenna Engineering Handbook to be published by McGraw-Hill Book Company.

10.

ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

513,480
DE84010271/GAR MF A01
Department of Energy, Oak Ridge, TN. Technical Information Div.
Energy Research Abstracts. Volume 8. Annual Index, January-December 1983. Corporate Author Index.
1983, 517p
See also DE83-016307 and DE84-010272.
Also available in set of 5 reports MF E10, DE84-010276. Microfiche copies only.

In the Corporate Index, report literature is indexed using the name of the organization or institution responsible for issuing the report. Headings are provided for all report literature and for published literature for which a corporate approach is especially desirable, e.g., symposium and conference proceedings. Each entry under a corporate heading gives the document title and the volume and abstract numbers. The document type, e.g., R for Report; country of publication, e.g., US; and language of the document, e.g., In German; are given in parentheses at the end of the entry. If no language statement appears, the language is English. Tables of document types and country of publication codes appear after the indexes.

513,481
DE84010272/GAR MF A01
Department of Energy, Oak Ridge, TN. Technical Information Div.
Energy Research Abstracts. Volume 8. Annual Index, January-December 1983. Contract Number Index.
1983, 213p
See also DE83-016308 and DE84-010273.
Also available in set of 5 reports MF E10, DE84-010276. Microfiche copies only.

Numbers assigned to DOE contracts under which reports announced in this publication were prepared are included in this index.

513,482
DE84010273/GAR MF A01
Department of Energy, Oak Ridge, TN. Technical Information Div.
Energy Research Abstracts. Volume 8. Annual Index, January-December 1983. Report Number and Order Number Correlation Index.
1983, 778p
See also DE83-016309 and DE84-010274.
Also available in set of 5 reports MF E10, DE84-010276. Microfiche copies only.

The numbers assigned to all reports cited in the publication appear in the first column of the index. The citation numbers are included in the second column. Cross reference information and/or availability are included as appropriate. Abbreviations used in the availability column are elaborated at the end of the index.

513,483
DE84010274/GAR MF E01
Department of Energy, Oak Ridge, TN. Technical Information Div.
Energy Research Abstracts. Volume 8. Annual Index, January-December 1983. Personal Author Index.
1983, 1063p
See also DE83-016310 and DE84-010275.
Also available in set of 5 reports MF E10, DE84-010276. Microfiche copies only.

Authors surnames are indexed in the form appearing in the abstracted publication; given names are reduced to initials. Each author entry gives the publication title and the citation number. Report numbers, if applicable, are given in parentheses at the end of the entry. For publications with multiple authors, an author entry is provided for each. Entries for the second and succeeding authors give references to the first author. Because of problems involved in the mechanical preparation of this index, all accent marks are omitted. Changes in spelling introduced as a result of accent omission follow standard conventions.

513,484
DE84010275/GAR MF E03
Department of Energy, Oak Ridge, TN. Technical Information Div.
Energy Research Abstracts. Volume 8. Annual Index, January-December 1983. Subject Index.
1983, 3177p
See also DE83-016311 and DE84-010274.
Also available in set of 5 reports MF E10, DE84-010276. Microfiche copies only.

The subject index is based on the use of subject descriptors selected from a controlled thesaurus of terms. Subject descriptors and qualifiers (subheadings) are selected.

513,485
DE85002276/GAR PC A04/MF A01
National Energy Information Center, Washington, DC.
Energy Information Directory, First Quarter 1982.
24 Mar 82, 69p DOE/EIA-0205(82/1Q)

A compilation of government offices and employees involved in energy matters is presented. The offices are classified according to their speciality. (ERA citation 10:004118)

513,486
DE85002293/GAR PC A03/MF A01
Department of Energy, Washington, DC. Energy Information Administration.
Directory of Energy Data Collection Forms.
15 Mar 82, 38p DOE/EIA-0249(82/1)
Portions are illegible in microfiche products.

This report contains an authoritative listing of the public-use statistical forms currently used as basic information gathering tools by the Department of Energy (DOE). This directory is designed to provide an overview of the DOE's statistical data collection program for decision makers in Federal, State, and local governments. All DOE forms currently used to collect statistical information are in this directory; excluded are forms for application for benefits and those used for administrative purposes. (ERA citation 10:004119)

513,487
N85-12350/3/GAR PC **A04**/MF **A01**
von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Comparative Review of Laser Doppler and Laser Two-Focus Anemometry in Turbomachinery Applications.
R. Klock. May 84, 71p VKI-TM-34

Laser Doppler and laser two-focus anemometry (LDA, L2F) for in-rotor measurements of turbomachinery at transonic speed are compared. The beam diameter in the measuring volume of L2F is 1/10 that of LDA, giving a high light concentration in the measuring volume so that measurements can be carried out using L2F without artificial seeding, or with seeding of submicron particle size. Small particles are of low inertia and can follow flow accelerations. This is very important in turbomachinery because of highly curved streamlines and compression shocks. The ability of L2F to detect small particles is its greatest advantage. The L2F can be operated with lower laser power than LDA when a lower light intensity in the measuring volume is acceptable. Minimum wall distance for L2F is 1/5 to 1/15 that of LDA. The L2F requires determination of mean flow direction, before velocity can be evaluated. The L2F fails in highly turbulent flow.

513,488
N85-12472/5/GAR PC **A05**/MF **A01**
Bremen Univ. (Germany, F.R.). Fachbereich Physik.
Investigations on the Dynamic Loading of Wind Energy Converters with Vertical Axis and Problems of Control During Starting and Overload Conditions.
Final Report, Mar. 1983.
S. Duetting, L. Helms, H. J. Strackerjan, K. H. Volk, and K. Simhan. Jul 84, 94p BMFT-FB-T-84-155
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

A Darrieus windmill rotor with straight fixed blade geometry is presented. Blade profile and converter geometry were investigated to improve starting properties. A brake system based on an air spoiler stream emerging from the support arms for rotor control at high speeds was developed. Performance calculations show that a selfstarting wind converter is feasible. The brake system allows control of a grid geared Darrieus converter under overload conditions almost solely through the generator. A wind tunnel developed for wind converter experiments is described.

513,489
PB85-135861/GAR PC **E04**/MF **E01**
Beak Consultants Ltd., Toronto (Ontario).
Howland House Monitoring Results.
Jul 84, 38p ISBN-0-7743-9880-9
Prepared in cooperation with Watershed Energy Systems Ltd., Toronto (Ontario). Sponsored by Ontario Ministry of Municipal Affairs and Housing, Toronto.

Energy monitoring was performed at Howland House to analyse energy usage, temperature stratification throughout the house, and to observe the energy input of various appliances. Using an Aeolian Kinetics Microcomputer, various sensors, both analog and status, were used to record temperatures, solar radiation levels, kilowatt hours consumption, appliance ontimes, furnace efficiencies, door and window opentimes, natural gas consumption and air flow rates.

513,490
PB85-146868/GAR PC **A04**/MF **A01**
National Bureau of Standards (NEL), Gaithersburg, MD. Center for Building Technology.
Multi-Year Plan for Experimental Systems Research-Passive and Hybrid Solar Energy Program,
J. Greenberg. Nov 84, 53p NBSIR-84/2972
Contract DE-A101-76PR06010

This report addresses the development of a multi-year plan for Experimental Systems Research focused at gaining the necessary knowledge to advance the understanding of passive and hybrid solar energy technology. This understanding includes the ability to acquire building performance data under controlled conditions so that the fundamental mechanism of the driving forces that effect change, along with the resulting change, can be studied. It includes the process whereby through a series of working meetings and exchange of correspondence, a list of candidate research areas were identified for both heating and cooling technologies. These research areas are defined and ranked and a resulting list of priorities established. This report articulates the results of this effort and details the recommended Experimental Systems Research Activities for solar passive and hybrid technologies for FY85 and beyond.

513,491
PB85-854289/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Solar Energy Concentrator Design and Operation. December 1981-January 1985 (Citations from the NTIS Data Base).
Rept. for Dec 81-Jan 85.
Jan 85, 231p
Supersedes PB83-804039.

This bibliography contains citations concerning the design and operation of a variety of solar energy concentrators. Topics include system descriptions, performance evaluations, technology reviews and development studies, cost considerations, and materials aspects. Optical properties of various systems, performance simulations, fabrication techniques and control systems are discussed. Photovoltaic and thermal systems are considered. (This updated bibliography contains 276 citations, 173 of which are new entries to the previous edition.)

513,492
PB85-854305/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Energy Supply and Demand Modeling. December 1981-January 1985 (Citations from the NTIS Data Base).
Rept. for Dec 81-Jan 85.
Jan 85, 278p
Supersedes PB83-804468.

This bibliography contains citations concerning the utilization of mathematical models in trend analysis and forecasting of energy supply and demand factors. Models are presented for the industrial, transportation, and residential sectors. Aspects of long term energy strategies and markets are discussed at the global, national, state, and regional levels. Electric utility forecasting, and a variety of fuels are presented, including coal, oil, and natural gas. (This updated bibliography contains 308 citations, 202 of which are new entries to the previous edition.)

513,493
PB85-854347/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Windmill Design, Development, Construction, and Performance. November 1982-January 1985 (Citations from FLUIDEX Data Base).
Rept. for Nov 82-Jan 85.
Jan 85, 155p
Supersedes PB84-857895.

This bibliography contains citations concerning the design, development, construction, and performance of windmills and associated systems, subsystems, and components. Both aerodynamic and structural performance characteristics are discussed. Attention is also given to the energy or power production and efficiency of windmills, and to specific system descriptions. (This updated bibliography contains 255 citations, 24 of which are new entries to the previous edition.)

513,494
PB85-901500/GAR Subscription
Department of Energy, Oak Ridge, TN. Technical Information Center.
Energy Meetings.
Monthly repts.
1985, 12 issues
Supersedes PB84-901500.
Paper copy available on subscription, North American Continent price $40.00/year; all others write for quote. Single copies also available in paper or microfiche.

Energy Meetings is a monthly publication listing conferences, symposia, workshops, congresses and other formal meetings pertaining to DOE's programmatic interests. Information about meetings is presented in two ways: Part I is a chronological list, and Part II is a list arranged by subject category. All meetings announced are also included in the information data base of the Department of Energy's Technical Information Center.

10B. Power Sources

513,495
N85-12469/1/GAR PC **A04**/MF **A01**
Nuklear-Chemie und -Metallurgie G.m.b.H., Hanau (Germany, F.R.). Zentralabteilung fuer Forschung und Entwicklung.
Development of the Production Technology of Cu2S/CdS Solar Generators.
Final Report, Dec. 1982.
B. Schurich. Jul 84, 56p BMFT-FB-T-84-137
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The feasibility of industrial scale production of large area Cu2S/CdS solar cells and modules was determined. About 600 large area semiconductor layers were fabricated and transformed into cell units. An absolute layer thickness variation of 0.1 microns is obtained for a pallet of 50 by 50 sq cm. The variation of CdS layer thickness referred to pallet area amounts to 1 to 1.3 microns. The efficiency of the solar cells is between 3.5% and 5%.

513,496
N85-12470/9/GAR PC **A14**/MF **A01**
Gesamthochschule Kassel (Germany, F.R.). Fachgebiet Energie-Elektronik.
Operational Behavior of Wind Energy Converters. Control and Dynamic and Types of Generators, Volume 1.
Final Report, Dec. 1982.
G. Cramer, P. Drews, M. Grawunder, S. Heier, and W. Kleinkauf. Jul 84, 321p BMFT-FB-T-84-154-V-1
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Dynamic behavior of isolated wind power stations and converters connected to a large grid was studied. The possibilities of feeding power from a variable speed generator to a fixed frequency grid were investigated. Measurements on laboratory equipment and existing installations show that double-fed induction generators with cycloconverters in the rotor circuit permit fast decoupled control of active and reactive power.

513,497
N85-12471/7/GAR PC **A10**/MF **A01**
Gesamthochschule Kassel (Germany, F.R.). Fachgebiet Energie-Elektronik.
Operational Behavior of Wind Energy Converters: Control and Dynamic and Types of Generators, Volume 2.
Final Report, Dec. 1982.
G. Cramer, P. Drews, M. Grawunder, S. Heier, and W. Kleinkauf. Jul 84, 225p BMFT-FB-T-84-154-V-2
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Dynamic behavior of isolated wind power stations and converters connected to a large grid was studied. Induction generators with slip-power recovery and synchronous generators with DC-link were investigated. Measurements on laboratory equipment and existing installations show the feasibility of fast active power control at reduced hardware cost.

513,498
N85-12473/3/GAR PC **A02**/MF **A01**
Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H.
Operating Experience with Potassium Systems.
N. Schwarz. Apr 84, 11p OEFZS-4275, RS-237/84
Presented at 3RD Bnes Conf. On Liquid Metals Eng. And Technol. In Energy Production, Oxford, Apr. 1984.

Use of potassium topping cycles to increase the conversion efficiency of thermal power stations is discussed. Feasibility studies show that such a process is economically possible with existing materials and today's technology. Material behavior and component reliability aspects of boilers, vapor lines and turbines, condensers, and boiler feed lines are discussed. Potassium and cover gas analysis, and safety factors are considered.

513,499
PB85-135036/GAR PC **A03**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.

Comparison of Fugitive Coal Dust Sizing Techniques,
J. H. Meyer, M. J. Lenkevich, and E. A. Davis. Oct 84, 37p PPSP/PPSE/T-32

In conjunction with a field test program to measure fugitive dust emissions from a rotary railcar dumper, several techniques for particle sizing have been compared. The comparison experiments were done at Potomac Electric Power Company's coal-fired generating station at Morgantown, Maryland with support of the Maryland Power Plant Siting Program. Three cascade impactor instruments were compared, including a quartz crystal microbalance. In addition, two other methods, a 40mm millipore filter operated isokineticaly and a rotary arm impactor, were used to obtain particulate samples for optical sizing from calibrated microphotographs. The microphotographs also provided information on coal particle shape, aggregation and friability. An aerodynamic particle sizer based on laser velocimetry was also used during one of three comparison tests. Two particle resuspension and sizing methods were attempted but abandoned due to experimental difficulties. Coal particle size and cumulative mass fraction size distributions for the various sampling techniques were compared.

513,500
PB85-135689/GAR PC A03/MF A01
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Rotary Rail Car Dumper Coal Dust Suppressant Experiment,
J. H. Meyer, L. G. Hereford, and M. J. Lenkevich. Oct 84, 41p PPSP/JHU/PPSE-T-31

A rotary rail car dumper dust suppressant experiment was performed at the PEPCO Morgantown Power Plant coal handling facility, Newburg, Maryland during the late summer and early fall of 1983. From previous observations of rotary coal car dumping, it was observed that large amounts of dust, especially for washed coal, were generated from the exposed top layer of coal in the open rail car. An overhead spray system using water and surfactant was used to examine the effectiveness of surface wetting just before dumping. High volume sampling at both the entrance and exit doorways of the dumper shed was used to determine the coal dust reduction. A total of 23 tests was performed, of which 16 tests were considered valid. All data were normalized for background, number of tons dumped and sampling time. The use of an overhead spray system can substantially suppress fugitive coal dust generated by rotary rail car dumping of coal. A water and surfactant mixture provided coal dust suppressant efficiencies ranging from 47% to 79% with an average of 61% for a combination of washed, mixed and unwashed coal.

513,501
PB85-145266 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Certification Program for Photovoltaic Modules.
Final rept.,
D. B. Thomas. 1982, 3p
Sponsored by Solar Energy Research Inst., Golden, CO.
Pub. in Solar Cells: Their Science Technology, Applic., and Econ. 7, n1-2 p183-185 Nov 82.

A brief discussion of the basic concepts of product certification is presented followed by a discussion of prerequisites for a proposed certification program for photovoltaic modules. One independent approved laboratory would serve as the certifier for the program with additional laboratories being approved if they are warranted by a demand for additional testing services. If the module certification program eventually needs a large number of laboratories for this type of testing, the approved laboratory program should be replaced by an accreditation program such as the National Voluntary Laboratory Accreditation Program (NVLAP) administered by the Department of Commerce.

513,502
PB85-145274 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Approved Laboratory Program for Photovoltaic Reference Cell Development.
Final rept.,
D. B. Thomas. 1982, 4p
Sponsored by Solar Energy Research Inst., Golden, CO.
Pub. in Solar Cells: Their Science Technology, Appl., and Econ. 7, n1-2 p131-134 Nov 82.

A program is proposed for establishing at least one approved laboratory for the fabrication, calibration, and certification of photovoltaic reference cells used in measuring the electrical output of solar cells and modules. The approved laboratory would be evaluated by NBS and monitored for proficiency by using a reference laboratory for reference cell verification testing.

10C. Energy Storage

513,503
PB85-136943/GAR PC A04/MF A01
Bureau of Mines, Minneapolis, MN. Twin Cities Research Center.
Battery Safety Procedures for Surface-Mining Equipment. A Bureau of Mines Handbook,
J. C. Mitchell. 1984, 62p BUMINES-HB-2-84

Recent mine accident data compiled by the Mine Safety and Health Administration indicate a need for better understanding by operators and mechanics of the hazards of lead-acid storage batteries and proper safety precautions to be observed when working with such batteries. This publication will familiarize the miner with lead-acid battery terminology and procedures for safe and proper battery installation, storage, inspection, testing, servicing, and jump starting of engines. These procedures are presented as a guide for assuring battery safety associated with surface mining equipment.

513,504
PB85-146876/GAR PC A03/MF A01
National Bureau of Standards (NEL), Gaithersburg, MD. Center for Building Technology.
Evaluation of Ettringite and Related Compounds for Use in Solar Energy Storage.
Progress rept.,
L. J. Struble, and P. W. Brown. Oct 84, 46p NBSIR-84/2942
Sponsored by Department of Energy, Washington, DC. Office of Solar Heat Technologies.

This report describes an investigation of ettringite and related phases for potential application in solar energy storage. The specific objective is to evaluate the potential of ettringite dehydration and rehydration as a phase change for energy storage. Synthesis procedures have been developed, and a number of ettringite-type phases have been prepared. The heat capacity of each phase was approximately 0.3 calories per gram per degree Celcius. Studies of the dehydration of these phases at atmospheric pressure indicate that the material has good potential as a phase change material for solar energy storage. Dehydration occurred at temperatures in the range between approximately 30C and 55C, with changes in enthalpy ranging between 100 and 240 calories per gram sample. In addition, ettringite was found to have a reversible hydrothermal reaction at approximately 50C, with an enthalpy change of approximately 4 calories per gram sample. Future work during the remainder of this program will involve completing the work described in the present progress report.

11. MATERIALS

513,505
N85-12148/1/GAR PC A03/MF A01
UKAEA Atomic Energy Research Establishment, Harwell (England).
Sour-Gas Cracking in Ferritic Steels.
C. A. Hippsley. May 84, 39p AERE-R-10908

The problem of sour-gas cracking in a steel gas-production equipment and pipelines is introduced and illustrated by a selection of service failures which have been suffered over the past 30 years. Two fracture mechanisms involved in sour-gas cracking are considered; step-wise cracking - a largely ductile mode generally occurring in lower-strength steels, and sulphide stress cracking - a more brittle mode of fracture usually confined to higher-strength steels. The methods by which material susceptibility to cracking in sour environments may be assessed are summarized. The micromechanism of step-wise cracking and sulphide stress cracking are then described in greater detail and employed, where possible, to rationalize the main conclusions drawn from extensive investigation of environmental and metallurgical influences on sour-gas cracking. The control of sour-gas cracking using current understanding and phenomenology thus obtained is also considered.

11A. Adhesives and Seals

513,506
PB85-854156/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Structural Adhesives: Formulations and Applications. 1973-January 1985 (Citations from the Rubber and Plastics Research Association Data Base).
Rept. for 1973-Jan 85.
Jan 85, 157p
Supersedes PB84-865278.

This bibliography contains citations concerning the composition, utilization, and performance of structural adhesives based on thermosetting and thermoplastic resins. Applications include the automotive, building, aircraft, and electrical industries. Among the materials examined are epoxies, acrylics, cyanoacrylates, phenolics, polysulfides, polyurethanes, and silicones. (This updated bibliography contains 255 citations, 31 of which are new entries to the previous edition.)

513,507
PB85-854196/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Hot-Melt Adhesives. 1970-January 1985 (Citations from the U. S. Patent Data Base).
Rept. for 1970-Jan 85.
Jan 85, 93p

This bibliography contains citations of selected patents concerning hot-melt adhesive materials, and application techniques. Methods and devices of using hot-melt adhesives in parts bonding and binding in the cigarette, construction, sports equipment manufacture, and publications industries are discussed. Composition and modification methods of hot-melt adhesives are considered. (Contains 131 citations fully indexed and including a title list.)

11B. Ceramics, Refractories, and Glasses

513,508
AD-P004 224/2/GAR PC A02/MF A01
Army Materials and Mechanics Research Center, Watertown, MA.
Ceramics as Substitutes for Scarce Metals,
R. N. Katz. Apr 84, 8p
This article is from the Proceedings of the Meeting of the Structures and Materials Panel (57th) Held at Vimeiro, Portugal on 14-19 Oct 83, AD-A148 598, p14-1 - 14-8.

Lack of domestic availability of critical industrial metals, such as chromium and cobalt make the U.S. economy vulnerable to supply disruption, or cartel inspired price manipulation. These critical metals are primarily used as high temperature, corrosion resistant or metal cutting alloys. Modern high performance ceramics are attractive substitutes for critical metals in many of these applications. This paper will explore opportunities for the use of ceramics as substitutes in several example applications. (Author)

513,509
DE85000652/GAR PC A03/MF A01
Los Alamos National Lab., NM.

Effect of Elevated-Temperature Neutron Irradiation on Fracture Toughness of Ceramics.
F. W. Clinard, G. F. Hurley, R. A. Youngman, and L. W. Hobbs. 3 Dec 84, 26p LA-UR-84-3137, CONF-841246-1
Contract W-7405-ENG-36
International conference on fusion reactor materials, Tokyo, Japan, 3 Dec 1984.

Single-crystal forms of MgAl sub 2 O sub 4 , Y sub 3 / Al sub 5 O sub 12 , and Al sub 2 O sub 3 were irradiated in the EBR-II fast fission reactor to a fluence of 0.3 x 10 exp 26 n/m exp 2 at 1015 exp 0 K, and to exp - 1 to 2 x 10 exp 26 n/m exp 2 at 925 and 1100 exp 0 K. Fracture toughness was subsequently measured at room temperature by an indentation technique, and radiation-induced defect aggregates were characterized by transmission electron microscopy. A slight increase in toughness of MgAl sub 2 O sub 4 was observed, and attributed to interaction of cracks with strain fields around dislocation loops. No significant change was noted for Y sub 3 Al sub 5 O sub 12 , despite the presence of a high concentration of unresolved defect clusters. Fracture toughness of Al sub 2 O sub 3 was markedly increased, with the enhancement apparently attributable in large part to impedance of crack propagation by interaction with the irradiation-induced void lattice. (ERA citation 10:002622)

513,510
DE85001008/GAR PC **A02/MF A01**
Lawrence Livermore National Lab., CA.
Ab Initio Calculations of the Optical Properties of Ions in Glass.
M. J. Weber. Aug 84, 16p UCRL-91384, CONF-840745-2
Contract W-7405-ENG-48
Symposium on glass science and technology, problems and prospects for 2004, Vienna, Austria, 1 Jul 1984.

There is interest in the optical properties of ions in insulating glasses for various applications. This paper addresses the task of predicting optical properties of ions in glass from first principles given only the physics of the constituent atoms. The prospects for developing such ab initio-computation procedures are gleaned from examining the progress made in understanding the properties of dopant ions in crystals. It is probable that in 20 years, there will be reliable procedures for predicting optical properties of ions in crystals, but the development of corresponding procedures for complex glasses is a herculean task. The use of computer simulations is addressed. (ERA citation 10:002796)

513,511
DE85001698/GAR PC **A03/MF A01**
Oak Ridge National Lab., TN.
Materials Project of the Energy Conversion and Utilization Technologies (ECUT) Program Progress Report for Year Ending September 30, 1982.
L. E. Morris, and J. A. Carpenter. Aug 84, 39p ORNL/TM-8940
Contract AC05-84OR21400

Progress is reported in the areas of high-temperature materials, tribology, and polymers and plastics. In high-temperature materials, work was on ductile long-range-ordered alloys based on the (Fe,Ni) sub 3 V system, reactive filler metals for ceramic-ceramic and ceramic-metal brazing, and a rotary kiln method of producing silicon carbide powders. Also, a workshop to determine long-range research needs in ceramic joining was held. In tribology, work was on the lubricant qualities of the molecular constituents of base stock oils and on friction and wear of dissimilar ceramics at elevated temperature. A workshop to determine long-range research needs in tribology was also held. In polymers and plastics, the efforts were on the recovery and reuse of plastic scrap, the aging of rigid urethane foam insulation, and plastic coatings for heat exchangers to be used in gaseous effluent streams below 200 exp 0 C. (ERA citation 10:002586)

513,512
DE85002179/GAR PC **A05/MF A01**
Pittsburgh Univ., PA. Dept. of Metallurgical and Materials Engineering.
High Temperature Corrosion of Ceramics. Progress Report, June 15, 1983-June 14, 1984.
J. R. Blachere, and F. S. Pettit. Feb 84, 99p DOE/ER/10915-3, SETEC-MME-84-021
Contract AC02-81ER10915

This report focuses on the hot corrosion of high purity and impure silicon nitride and silicon carbide at 1000 exp 0 C in SO sub 2 -SO sub 3 -O sub 2 and oxygen atmospheres. Results are in good agreement with published data, in particular for the degrading influence of impurities on the oxidation resistance of silicon nitride and silicon carbide. However the morphology and thickness of the crystalline oxide formed on the single crystal SiC did not differ significantly for the silicon-side or the carbon-side. No reaction was observed between high purity silicon nitride or silicon carbide and SO sub 3 in SO sub 3 -SO sub 2 -O sub 2 mixture at 1000 exp 0 C. No significant impurity concentration was found in the oxide layers formed at 1000 exp 0 C. Sulfates formed with some impurities when they had been concentrated in the oxide layer during prior oxidation at 1400 exp 0 C. With Na sub 2 SO sub 4 deposits in SO sub 3 -containing atmospheres little hot corrosion was observed for the high purity Si sub 3 N sub 4 and SiC. It was usually characterized by the formation of cristobalite globules under the salt. In general the Na sub 2 SO sub 4 deposits tend to bring the impurity effects, observed in oxidation experiments, down to lower temperatures. The silica scales formed on these materials are more significantly degraded in O sub 2 atmospheres than in atmospheres containing SO sub 3 as anticipated by the more basic conditions generated in O sub 2 and the acid nature of the silica scales. SiO sub 2 and Al sub 2 O sub 3 are very resistant to gaseous corrosion, in SO sub 3 -containing atmospheres. Preliminary results on their hot corrosion at 1000 exp 0 C indicates the susceptibility of silica to basic conditions developed with Na sub 2 SO sub 4 deposits in oxygen atmosphere. The impure aluminas exhibited the same tendency because they contain silicate impurities. (ERA citation 10:002731)

513,513
DE85002301/GAR PC **A03/MF A01**
Oak Ridge National Lab., TN.
Wear Coefficients and Wear of Sliding Ceramics.
C. S. Yust. 1983, 30p DOE/OR/21400-T58
Contract AC05-84OR21400
Portions are illegible in microfiche products.

The study of the wear of ceramics has become increasingly significant as greater interest is expressed in the use of ceramic components in machines. In common with metals, ceramic machine components will be required to retain structural and dimensional stability for economically useful service periods. In neither metal nor ceramic systems are basic wear mechanisms unambiguously understood, but in recent years significant contributions have been made in identifying major features of the wear process. This discussion begins with a brief overview of some of the basic concepts in wear, introduces the wear coefficient as a measure of wear, and then presents some current results on ceramics of interest for heat engines. (ERA citation 10:002732)

513,514
N85-12155/6/GAR PC **A03/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Microstructure and Properties of Ceramics.
K. Hamano. Aug 84, 26p NAS 1.15:77416, NASA-TM-77416
Contract NASW-3541
Transl. into English from Seramikkusu (Japan), V. 17, No. 8, 1982 p 582-590. Transl. by Kanner (Leo) Associates, Redwood City, CA. Original Document Prep. by Tokyo Inst. Of Technol.

The history of research into the microstructure and properties of ceramic ware is discussed; methods of producing ceramics with particular characteristics are investigated. Bubbles, sintering, cracks, and electron microscopy are discussed.

513,515
N85-12156/4/GAR PC **A03/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Brittleness of Ceramics.
F. Kroupa. Aug 84, 46p NAS 1.15:77504, NASA-TM-77504
Contract NASW-3541
Transl. into English from Cesk. Caspois Pro Fyziku, Sect. A (Czechoslovakia), V. 32, No. 1, 1982 p 1-25. Original Language Document Previously Announced in Iaa as A82-28297. Transl. by Kanner (Leo) Associates, Redwood City, CA. Original Document Prep. By State Research Inst. For Materials, Prague.

The main characteristics of mechanical properties of ceramics are summarized and the causes of their brittleness, especially the limited mobility of dislocations, are discussed. The possibility of improving the fracture toughness of ceramics and the basic research needs relating to technology, structure and mechanical properties of ceramics are stressed in connection with their possible applications in engineering at high temperature.

513,516
N85-12157/2/GAR PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Microstructure of Ceramics Fabricated by Unidirectional Solidification.
T. Kokubo. Aug 84, 22p NAS 1.15:77423, NASA-TM-77423
Contract NASW-3541
Transl. into English from Seramikkusu (Japan), V. 18, No. 3, 1983 p 176-183. Transl. by Kanner (Leo) Associates, Redwood City, CA. Original Document Prep. by Kyoto Univ.

The unidirectional solidification methods are zone melting, crystal pulling, Bridgemen, and slow cooling. In order to obtain excellent properties (such as transparency), pores, voids and cracks must be avoided, and elimination of such defects is described.

513,517
N85-12160/6/GAR PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Ceramic Powder for Sintering Materials.
H. Akiya, and A. Saito. Mar 84, 16p NAS 1.15:77434, NASA-TM-77434
Contract NASW-3541
Transl. into English from Seramikkusu (Japan), V. 18, No. 4, 1983 p 284-288. Transl. by Kanner (Leo) Associates, Redwood City, CA. Original Document Prep. by Morimura Bros., Inc., Tokyo.

Surface activity of ceramic powders such as MgO and Al2O3, for use in sintering with sp. emphasis on their particle size, shape, particle size distribution, packing, and coexisting additives and impurities are reviewed.

513,518
N85-12161/4/GAR PC **A03/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Sintering Behavior of Ultrafine Silicon Carbide Powders Obtained by Vapor Phase Reaction.
Y. Okabe, K. Miyachi, J. Hojo, and A. Kato. Jun 84, 30p NAS 1.15:77422, NASA-TM-77422
Contract NASW-3542
Transl. into English from Nippon Kagaku Kaishi (Japan), No. 9, 1981 p 1363-1370. Transl. by Scientific Translation Service, Santa Barbara, CA.

The sintering behavior of ultrafine SiC powder with average particle size of about 0.01-0.06 microns produced by a vapor phase reaction of the Me4Si-H2 system was studied at the temperature range of 1400-2050 deg. It was found that the homogeneous dispersion of C on SiC particles is important to remove the surface oxide layer effectively. B and C and inhibitive effect on SiC grain growth.

513,519
PB85-139327/GAR PC **E04/MF E04**
Centre d'Etude de l'Energie Nucleaire, Mol (Belgium).
CEN/SCK (Centre d'Etude de l'Energie Nucleaire/Studiecentrum voor Kernenergie) Activities on Ceramics.
A. J. Flipot. Oct 84, 34p BLG-572
Summaries in French and Dutch.

This report describes the technical experience CEN/SCK has developed in close collaboration with the Belgian nuclear industry, the recent developments carried out in the framework of a study on ceramic breeder materials for fusion reactors and the research on fabrication and characterization of advanced technical ceramics such as, for instance, silicon nitride or ceramics for heat exchangers. The experience in the field of nuclear fuels covers oxides and carbides, pelleted and vibrocompacted fuels. Some important aspects such as homogeneity of the mixed fuel and diametral tolerances of the pellets are discussed. An original method for preparing sinterable lithium metasilicate is described. It is essentially based on the formation of an intermediate phase the existence of which has been discovered during the study. This phase which is formed around 430C is easily transformed into metasi-

licate by calcining it under wet air. The resulting metasilicate is high sinterable and suits perfectly to the fabrication of high-density pellets by cold compaction and sintering. The silicon nitride study covers the following shape forming techniques: slip casting, injection molding, extrusion and hipping. The bodies are prepared from silicon nitride powders (SSN) or from silicon powders which are nitrided later on (RBSN). This study is performed in a computerized thermobelance, which makes, for instance, possible to pilot the furnace in such a way that the weight of the compact increases linearly with time.

513,520

PB85-140945 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Effect of Sliding Friction Forces on the Strength of Brittle Materials.
Final rept.,
B. R. Lawn, S. M. Wiederhorn, and D. E. Roberts.
1984, 9p
Pub. in Jnl. of Materials Science 19, p2561-2569 1984.

A model is developed for the strength degradation of brittle surfaces in sliding contact with spherical indenters. The loss of strength is associated with the propagation of partial cone cracks in the wake of the indenter. Detailed fracture mechanics calculations are circumvented by working in the limit of ideal point-load contacts, with the key proposition that the crack dimensions remain insensitive to rotations of the cone axis relative to the specimen free surface. In this way the simple Roesler solution for classical, well-developed cone cracks may be retained as a convenient 'reference state' for a more general theoretical description, whereby the superposition of a tangential friction force onto the normal loading is accommodated via a straightforward coordinate transformation operation.

513,521

PB85-142867 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Revised ThO2-Nb2O5 Phase Diagram.
Final rept.,
R. J. Cava, R. S. Roth, and D. B. Minor. 1981, 2p
Pub. in Jnl. of the American Ceramic Society 64, n4 p64-65 Apr 81.

The phase equilibrium diagram of the system ThO2-Nb2O5 was redetermined near the composition Th2Nb2O9. This phase was found to melt incongruently at 1382C, with a peritectic at about 64 mol % ThO2. The eutectic was found at about 1350C and 63 mol % ThO2. From single crystal and powder x-ray diffraction data, Th2Nb2O9 was found to have a primitive monoclinic unit cell with a = 6,711(1), b = 25.254(5), c = 7.757(1)A, beta = 90.461(14) degrees.

513,522

PB85-854180/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Silicon Nitrides. 1970-January 1985 (Citations from the U. S. Patent Data Base).
Rept. for 1970-Jan 85.
Jan 85, 89p

This bibliography contains citations of selected patents concerning silicon nitride (SN) materials and their applications in industries, including the uses of SN films in semiconductor devices, cutting tools, and gas turbine components. Methods of producing protective, thermally stable, and electrically insulating SN materials by sintering and densification are discussed. Nitridation, and deposition processes of producing SN films on semiconductor substrates are disclosed. (Contains 113 citations fully indexed and including a title list.)

11C. Coating, Colorants, and Finishes

513,523

AD-P004 221/8/GAR PC **A03**/MF **A01**
GEC Turbine Generators Ltd., Whetstone (England).
Practical Implications of the Use of Aluminide Coatings for the Corrosion Protection of Superalloys in Gas Turbines,
A. Strang, E. Lang, and R. Pichoir. Apr 84, 35p
This article is from the Proceedings of the Meeting of the Structures and Materials Panel (57th) Held at Vimeiro, Portugal on 14-19 Oct 83, AD-A148 598, p11-1 - 11-35.

The primary objective of this paper is to consider in some detail the nature of the difficulties incurred in the pack aluminising of superalloys, especially in terms of prolonging component life without prejudice to performance, integrity and safety of the engine. The paper will first of all review the objectives and requirements of using aluminide coatings, the processes currently commercially available, the compatability of aluminide coatings with various superalloys substrates as well as the more general question of overall quality control of both the coating and the coated component. The properties of coatings themselves will be considered in terms of their corrosion resistance, overall thermal and structural stability, and effect on the mechanical properties of the substrate. Finally, the problems of long term corrosion protection will be examined in terms of the practicalities of reclaiming and recoating of exservice turbine parts with view to extending component life and conservation of critical materials.

513,524

AD-P004 222/6/GAR PC **A02**/MF **A01**
Atomic Energy Research Establishment, Harwell (England).
Coatings for Fuel Economy or Materials Substitution,
J. P. Coad, and K. T. Scott. Apr 84, 11p
This article is from the Proceedings of the Meeting of the Structures and Materials Panel (57th) Held at Vimeiro, Portugal on 14-19 Oct 83, AD-A148 598, p12-1 - 12-11.

The application of three coating techniques to problems of fuel economy or materials substitution is described. The coating techniques are plasma spraying, Sputter Ion Plating (SIP) and Plasma Assited Vapour Deposition (PAVD), and the applications range from thin coatings for nuclear and aerospace use to free standing furnance elements. (Author)

513,525

AD-P004 226/7/GAR PC **A02**/MF **A01**
Pratt and Whitney, West Palm Beach, FL. Government Products Div.
Coating Developments to Restrict Strategic Materials Usage,
R. J. Hecht, and D. S. Halfpap. Apr 84, 7p
This article is from the Proceedings of the Meeting of the Structures and Materials Panel (57th) Held at Vimeiro, Portugal on 14-19 Oct 83, AD-A148 598, p18-1 - 18-7.

Hot section gas turbine engine components have relied on the use of superalloys which contain high percentages of strategic elements to attain an optimum compromise of high temperature strength, corrosion and oxidation resistance. Due to limited availability and price fluctuations of certain key alloying elements, such as cobalt and tantalum, selection and substitution of superalloys with lower strategic element content is being accomplished. The change in alloy often leads to the use of materials with less corrosion and oxidation resistance. This paper describes the development of protective coatings that have enabled the implementation of less environmentally stable alloys with no loss, and sometimes an increase, in component capability and life. Development of tailored MCrA1Y overlay coatings, improved diffusion aluminides, thermal barriers, and alternate wear resistant coatings has enabled the coating corrosion and oxidation life to be more independent of the base superalloy composition and hence allow more latitude in alloy selection. The resulting coating developments and their effects on reducing strategic element use are presented.

513,526

N85-12142/4/GAR PC **A02**/MF **A01**
British Petroleum Co. Ltd., Sunbury-on-Thames (England).
Development of CVD Oxide Coatings for the Protection of Metal Surfaces.
J. T. K. Clark, A. I. Foster, M. L. Sims, M. A. M. Swidzinski, and D. Young. 1984, 12p
Presented at 4TH European Conf. On CVD, Eindhoven, Netherlands, 31 May - 2 Jun. 1983.

Silica and titania chemical vapor desposition coatings developed for the protection of metal substrates are shown to be effective in a range of environments at temperatures between ambient and 1000C. By conducting the coating process at temperatures appropriate to the substrate and the ultimate temperature of usage, highly stable, adherent and impermeable coatings are formed. Silica coatings protect high alloy steels against oxidation and carburization and reduce metal-catalyzed carbon deposition, at temperatures up to 1000C. Titania coatings confer corrosion resistance to mild steel and other substrates when immersed in saline and acid environments.

513,527

N85-12158/0/GAR PC **A03**/MF **A01**
Materials Research Labs., Ascot Vale (Australia).
Surface Coatings for Low Emittance in the Thermal Surveillance Band.
R. L. Calvert, J. A. Gagliardi, and A. D. Mclachlan.
Aug 84, 32p MRL-R-937, AR-003-922

Two types of coatings were investigated; optical quality semiconductor thin films and paint. The semiconductor thin films usually provide much lower emittances than paint and many combinations of different materials were studied in inhomogeneous or graded index metal/dielectric interference films and as single layers of diamond like carbon coatings - low emittance paint is used in solar energy, they are divided into thickness sensitive and thickness insensitive paints. Values of emittance comparable to those for thickness sensitive paints are presented.

513,528

N85-12180/4/GAR PC **A02**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England).
New Coatings for High Temperature Materials Protection.
M. J. Bennett. Aug 84, 25p AERE-R-11387, AGR-CWG/P(84)72

The development, characterization and performance evaluation of two new thin (approx 20 micro m) ceramic coatings for high temperature materials protection is reviewed. These coatings were silica produced by two vapor deposition procedures and ceria formed by sol-gel technology. The current position regarding the use of these coatings in the UK nuclear industry is described.

513,529

PB85-142784 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Optical-Properties of Black Chrome - A Model for Predicting the Effect of Exposure to Elevated Temperature.
Final rept.,
S. T. Wu, and L. W. Masters. 1982, 5p
Sponsored by Department of Energy, Washington, DC.
Pub. in Jnl. of Coatings Technology 54, n691 p41-45 1982.

The paper summarizes the first phase of research to help meet the need for predictive models. The scope of this initial phase of research was to develop a model on predicting the effects of elevated temperature on the optical properties of black chrome. Oven aging tests were performed in the laboratory at temperatures of 150C, 200C, and 250C. The permanent change in optical properties was found to reach a maximum within only a few days after initiation of the exposure. The nature of the change in reflectance spectra was found to be a horizontal shift along the wavelength axis. The model was developed based on these findings. Reasonable numerical fits were made by applying the model to the test data.

513,530

PB85-144038 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Plating Standards and Specifications.
Final rept.,
F. Ogburn, and E. T. Clegg. 1984, 22p
Pub. in Electroplating Engineering Handbook 4, p263-284 1984.

The electrodeposited coating standards of the ISO, ASTM, SAE, and U.S. Government are discussed in some detail. The requirements of the specifications are reviewed and the coating thickness requirements are tabulated.

513,531
PB85-854578/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Metallization of Plastics. March 1983-January 1985 (Citations from the Engineering Index Data Base).
Rept. for Mar 83-Jan 85.
Jan 85, 63p
Supersedes PB84-859586.

This bibliography contains citations concerning the metallization of plastics and plastic films using a variety of application techniques. Methods described include vapor deposition, sputtering, and electroless plating. Plastic surface preparation prior to the metallization process is discussed. Metallized plastics for the packaging industry, electromagnetic shielding, and decorative coatings are among the applications included. (This updated bibliography contains 90 citations, 11 of which are new entries to the previous edition.)

513,532
PB85-854610/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Antifouling Coatings: Marine Applications. 1970-January 1985 (Citations from the Engineering Index Data Base).
Rept. for 1970-Jan 85.
Jan 85, 114p
Supersedes PB84-860915.

This bibliography contains citations concerning protective coatings for the prevention of marine fouling. The biochemistry of tin-based organometallic compounds and their toxic properties are discussed. The formulation of paints with controlled release toxicants for longer antifouling activity is also included. (This updated bibliography contains 156 citations, 12 of which are new entries to the previous edition.)

513,533
PB85-854701/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Plastics and Elastomers as Protective Coatings. 1973-January 1985 (Citations from the Rubber and Plastics Research Association Data Base).
Rept. for 1973-Jan 85.
Jan 85, 189p
Supersedes PB84-853746.

This bibliography contains citations concerning thermoplastics, thermosets, and elastomers as protective coatings and paints. Epoxies, polyurethanes, teflons, and polyesters are examined. Applications to aircraft, marine, building, commercial, and industrial products are included. Performance evaluations of selected materials are included. (This updated bibliography contains 326 citations, 55 of which are new entries to the previous edition.)

11D. Composite Materials

513,534
AD-A148 595/2/GAR PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Technology Lab. for Advanced Composites.
Development of a Compression Testing Method for Graphite/Epoxy Coupons.
Interim rept.,
C. J. Dunmire. Oct 82, 37p TELAC-82-17, AFOSR-TR-84-1089
Grant AFOSR-82-0071

The purpose of this investigation was to develop a method of testing the standard TELAC (Technology Laboratory for Advanced Composites) graphite/epoxy coupon directly in compression. Since thin coupons buckle under compressive loads, a compression jig was needed to support the coupon and prevent it from buckling. The most successful design for a compression jig was a set of 300 steel balls that are pressed onto both sides of the coupon. These 1/4 inch diameter steel balls are free to rotate insuring that no shear load is applied to the coupon. These steel balls are housed in two steel plates, one for each side of the coupon. An Aluminum cage bolted onto each plate holds the balls onto the plate. Preliminary tests indicate that this compression jig could provide valid test results.

513,535
AD-A148 630/7/GAR PC **A02**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Aerospace and Ocean Engineering.
Modeling Localized Stress Fields in Composite Laminates.
Final scientific rept. 15 Jun 83-31 Mar 84,
E. R. Johnson. Jul 84, 10p AFOSR-TR-84-1116
Grant AFOSR-83-0191

A structural model is developed using Reissner's variational principle to analyze stress gradient problems in laminated composite plates. A statically admissible stress field, which has explicit dependence on the thickness coordinate, is selected for each layer. Both interlaminar traction and displacement continuity are enforced between layers. This model is similar to an earlier one developed by Pagano, but has four dependent variables less per layer than Pagano's model. It is shown that the model can duplicate Pagano's results for the same number of subdivisions through the thickness. The uniform axial extension of a bidirectional symmetric laminate is used as the example problem for comparison to Pagano's theory and to illustrate the methodology. Originator-supplied keywords include: stress concentration, and interlaminar stresses.

513,536
AD-A148 673/7/GAR PC **A03**/MF **A01**
Naval Surface Weapons Center, Silver Spring, MD.
Physical Properties of the Nickel Composite Sintered Plaque.
Interim technical rept. 1981-1982,
W. A. Ferrando, W. W. Lee, A. L. Lee, and R. A. Sutula. Dec 82, 31p Rept no. NSWC/TR-82-416

The nickel composite plaque is a new concept in sintered substrates for application in alkaline energy storage systems. The plaque is fabricated from nickel coated graphite fibers which, upon sintering in reducing atmosphere, produces a strong lightweight structure of open porosity suitable for electrode use. The four test areas of this report include: tensile strength, porosity, electrical resistivity and SEM micrography of the plaque structure. Porosities of 55 to over 90 percent void volume are achievable with the composite plaques, while maintaining structural integrity. Porosimetry measurements indicate approximately a 4X greater than mean pore size and 1.5X broader pore size distribution than commercial powder sinter. Tensile strengths were measured as a function of nickel coating thicknesses.

513,537
AD-A148 698/4/GAR PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
Simulation of Repetitively-Pulsed Laser Irradiation of Graphite-Epoxy Composite.
Memorandum rept.,
G. P. Mueller. 12 Dec 84, 31p Rept no. NRL-MR-5467

The CW laser irradiation code of Griffis, Masumura and Chang was modified to simulate pulsed laser irradiations. Extensive changes were required to cure the numerical instabilities produced in the code by the high peak powers common to pulsed lasers. The new code was tested against the original Griffis, Masumura and Chang code and against a simple heat capacity model. A comparison was made with some of the experimental pulsed irradiations of Cozzens, et al, resulting in doubts about the accuracy of the model for the thermal properties of the graphite-epoxy under rapid heating.

513,538
AD-A148 729/7/GAR PC **A04**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Annapolis, MD. Ship Materials Engineering Dept.
Fabrication, Processing and Characterization of Multidimensionally Braided Graphite/Epoxy Composite Materials.
Final rept.,
A. B. Macander, R. M. Crane, and E. T. Camponeschi. Oct 84, 52p Rept no. DTNSRDC/SME-84-66

This report describes research concerning the braiding, resin impregnation and characterization of multidimensionally braided fiber reinforced composite materials. These materials are an alternative to conventional laminated composite structures and have the potential for being more damage tolerant. The braiding process in initially described, indicating the methodology used and the potential applications for this material. Next, three processes are described which have been used for resin impregnation of the multidimensionally braided panels characterized in this study. Two were resin transfer techniques utilizing vacuum or pressure as the transferring machanism while the third was a resin film lamination technique. While all three methods are presented, the latter technique was chosen for impregnating the test specimens due to the consistently low void content and superior surface quality achieved. Three graphite fiber systems were used in this investigation. These were braided into panels in which three braid parameters could be investigated. The variables investigated include the effect of edge condition, braid pattern, and tow size on the tensile, compressive, flexural and interlaminar shear properties. These properties were obtained in the braid direction only.

513,539
AD-P004 219/2/GAR PC **A02**/MF **A01**
National Physical Lab., Teddington (England).
Potential of Metal-Matrix Composites as Superalloy Substitutes.
M. McLean, and T. Khan. Apr 84, 10p
This article is from the Proceedings of the Meeting of the Structures and Materials Panel (57th) Held at Vimeiro, Portugal on 14-19 Oct 83, AD-A148 598, p9-1 - 9-10.

The potential of metal-matrix composites as gas-turbine blade materials has largely been judged on the increased temperature capabilities they offer over the strongest current superalloys. However, several composites that have been rejected on this basis are either independent of or have low concentrations of critical alloying elements. Consequently they should be reassessed as reserve materials matching the performance of existing widely used superalloys that depend on strategically vulnerable constituents. A review of metal-matrix composites for high temperature applications will be made in order to identify materials that are insensitive to the supply of critical elements. An alternative approach might be to consider the potential of regenerating the original creep performance of certain monocarbide reinforced nickel based composites - such as Cotac 744 developed at ONERA - after service exposure. In this context the combination of perfectly elastic fibres in a creeping matrix would imply that high temperature deformation of these materials is almost completely recoverable.

513,540
DE84016118/GAR PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Comparison of Methods for Predicting Fiber Stresses in a Cracked Kevlar/Epoxy Monolayer.
E. D. Reedy. 1984, 18p SAND-84-0867C, CONF-841201-11
Contract AC04-76DP00789
ASME winter annual meeting, New Orleans, LA, USA, 9 Dec 1984.

Shear-lag and 3-D finite element predictions for the fiber stresses in a cracked Kevlar 49/epoxy monolayer are compared. Results are given for a 5-fiber wide monolayer containing a single broken fiber. Both methods of analysis are found to predict nearly the same fiber stress distribution along the crack-tip fiber when the monolayer is fully elastic. Results for highly loaded monolayers with extensive matrix yielding are not in quite as good agreement, but even then the predicted stress distributions are within 5%. These calculations show that a shear-lag analysis is accurate even though the Kevlar 49 fiber is highly anisotropic. (ERA citation 10:002757)

513,541
DE85000836/GAR PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Wavecode Constitutive Models: Nonhomogeneous Mixtures.
D. S. Drumheller. Nov 84, 24p SAND-84-0713
Contract AC04-76DP00789
Portions are illegible in microfiche products.

A one-dimensional theory for spatially nonhomogeneous mixtures composed of up to four constituents with void is considered. The implementation of this model into a one-dimensional Lagrangian wavecode is also discussed. Example calculations for an isentropic compression wave generated by a material fabricated from tantalum, copper, aluminum, and polyolefin powders are given. The initial development of this model

was in support of high-pressure (> 100 Gpa) equation of state studies. (ERA citation 10:002756)

513,542
DE85002454/GAR PC A02/MF A01
Oak Ridge National Lab., TN.
Toughening Behavior in SiC Whisker Reinforced Alumina.
P. F. Becher, and G. C. Wei. 1983, 12p CONF-8310105-1
Contract AC05-84OR21400
Joint meeting of the Basic Science and Nuclear Divisions of the American Ceramic Society, Columbus, OH, USA, 30 Oct 1983.

The development of hot-pressed, SiC whisker reinforced alumina has resulted in composites with fracture toughness values of up to 8.7 MPa m/sup 1/2/. Whisker orientation during processing leads to anisotropy in both fracture toughness and fracture strengths. Fracture strengths are also limited by the ability to disperse the SiC whiskers; however, use of both fine alumina powders and ultrasonic dispersion techniques yields strengths of up to 800 MPa. (ERA citation 10:002754)

513,543
N85-12092/1/GAR PC A02/MF A01
National Aerospace Lab., Tokyo (Japan).
Thermal Deformation Measurements of Heat-Resistant Structural Materials for Aircraft by Electro Optical Displacement Transducer.
Y. Aoki, and Y. Tada. May 84, 13p NAL-TR-810
In Japanese; English Summary.

Using an Electro-Optical Displacement Transducer (EODT), thermal expansion tests ranging from room temperature up to 300 C were conducted with sheet specimens of glass/polyimide composite laminates. The relations between thermal expansion properties and temperatures in fiber directions 0, 45, and 90 degree as well as those of stacking sequence of layers and out-of-plane deformation in heating were obtained by employing heat-resistant markers as the optical targets of the EODT. The technique was adapted in thermal expansion and tension tests of titanium alloy (Ti-6Al 1-4V) specimens at temperatures ranging from room temperature to 500 C, and the result demonstrated the validity of the present technique.

513,544
N85-12094/7/GAR PC A03/MF A01
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Long-Term Thermal Aging of 2 Graphite-Polyimide Composite Materials.
J. B. Nelson. 1984, 28p NAS 1.60:2369, L-15849, NASA-TP-2369

Two graphite/polyimide composite materials were aged in circulating air ovens at temperatures 204 C, 232 C, 260 C, and 288 C for various times up to 25000 hours. The composites were: (1) Celanese Celion 6000 graphite fiber and PMR-15 polyimide resin (Celion/PMR-15) and (2) Celion 6000 graphite fiber and LARC-160 polyimide resin (Celion/LARC-160). Three unidirectional specimen geometries were studied: short beam shear (SBS) specimens, flexure specimens, and 153 mm square panels. The interior regions of the square panels exhibited only minor property degradation. The individually aged SBS and flexure specimens exhibited large reductions in strengths after aging. Both laminate materials cracked and degraded preferentially at the specimen edge perpendicular to the fibers.

513,545
N85-12095/4/GAR PC A02/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
High Performance Fibers for Structurally Reliable Metal and Ceramic Composites.
J. A. Dicarlo. 1984, 16p NAS 1.15:86878, E-2339, NASA-TM-86878
Presented at a Conf. On High Performance Textiles Structures, Philadelphia, 6-8 Jun. 1984; Sponsored by the Fiber Soc. And Sampe.

Very few of the commercially available high performance fibers with low densities, high Young's moduli, and high tensile strengths possess all the necessary property requirements for providing either metal matrix composites (MMC) or ceramic matrix composites (CMC) with high structural reliability. These requirements are discussed in general and examples are presented of how these property guidelines are influencing fiber evaluation and improvement studies at NASA aimed at developing structurally reliable MMC and CMC for advanced gas turbine engines.

513,546
N85-12100/2/GAR PC A02/MF A01
Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
Influence de la Methode d'Essai et de la Rigidite du Materiau sur les Dommages Occasionnes Par les Chocs a Basse Vitesse sur Composites Carbone Epoxy. Proces Verbal No. 45.387/1 (Influence of Test Method and Material Stiffness on the Damage Produced by Low Velocity Impacts on Carbon-Epoxy Composites No. 45.387/1).
G. Hilaire, and B. Soulezelle. 29 Feb 84, 23p REPT-45.387/1
Contract STPA-83.96003
Text in French.

Impact damage on carbon-epoxy composites was studied as a function of specimen dimension, initial damage energy threshold, specimen deformation and projectile mass. Analysis shows that the free length of the specimen has a marked influence on the results, and that the measure of the deformation under impact correlates well with predictions.

513,547
N85-12101/0/GAR PC A03/MF A01
Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
Etudes Generales sur les Materiaux Composites. Evaluation de Produits d'Environnement d'Origine Nationale (General Studies on Composite Materials. Evaluation of Auxiliary Products of National Origin).
Final Report.
B. Martinie. 10 May 84, 31p SNIAS-2500/DCI-PR/84
Contract STPA-83.96.003
Text in French.

The possibility of substitution of auxiliary materials used in the manufacture of carbon-epoxy composites was studied in order to reduce costs and to encourage local procurement. Nylon diaphragms used in molding were substituted by silicone elastomeric diaphragms. A waterproofing resin was substituted by a silicone rubber. The advantages of the substitutions are demonstrated.

513,548
N85-12102/8/GAR PC A05/MF A01
Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
Etude de la Fissuration Par Delaminage Sous Sollicitations Statiques et Cycliques de Materiaux Composites Carbone-Epoxy. Proces Verbal No. 42-787/F (Study of Delamination Cracking under Static and Cyclic Loads of Carbon-Epoxy Composite Materials).
M. Vancon, and C. Bathias. 13 Apr 84, 81p REPT-42-727/F
Contract DRET-81.341.83.00
Text in French.

Layer separation mechanisms in carbon epoxy composites were studied to help in the interpretation of fracture photography. Tension and shear layer separation are considered. Elementary models are proposed based on the combination of accurate observation of load parameters with the images furnished by the optical microscope, the scanning microscope, and X-rays. It is shown that the tomodensitometry is the best method to study delamination.

513,549
PB85-137271/GAR PC E07/MF E07
Societe Nationale des Poudres et Explosifs, Vert-le-Petit (France). Centre de Recherches du Bouchet.
Vieillissement de la Resine PSP et des Fibres de Carbone (Aging of PSP Resin and Carbon Fibers),
C. Gourdin, and J. M. Dartyge. 18 Jun 84, 126p R-55/84/CRB/NP
Text in French.

Fibers of high-resistance carbon (T 300 B, T 300 C, AS4, HTS2, XAS) and of carbon/ PSP stratified were aged at 250C in air. A classification of fibers from the thermo-oxidation point of view could be established, without making it possible to connect it with the chemical fiber composition. The micropous structure, the order condition of the carbon, the orientation texture of the carbon lamella stratification of the fibers were studied by means of X-ray diffusion at small angles and diffraction of the X rays. These analyses, coupled with measurements of the specific surface, made it possible to demonstrate the fiber oxidation process. In addition, we have shown that it is difficult in the case of the PSP to connect the oxidizability of the resin with that of the stratified material.

513,550
PB85-139681/GAR PC E05/MF E05
Oxford Univ. (England). Dept. of Engineering Science.
Behavior of Fibre-Reinforced Composites under Dynamic Tension,
K. Saka, and J. Harding. 1984, 52p OUEL-1543/84

A small gas gun, capable of accelerating a projectile 1m long by 25.4mm dia. to about 50m/s, and an extended split Hopkinson pressure bar apparatus have been designed and constructed for the tensile impact testing of fiber-reinforced composite specimens at strain rates of the order of 1000/s. Commissioning tests have shown equilibrium in the specimen to be attained at an early stage in the test and the effects of stress wave reflections in the specimen grip regions on the calculated stress-strain response to be negligibly small. A technique has been developed for the preparation of low volume fraction 'model' hybrid specimens, unidirectionally reinforced with a single layer of fiber tows, alternately of glass and of carbon fibers.

513,551
PB85-142636 Not available NTIS
National Bureau of Standards, Boulder, CO.
Multiple Scattering of Elastic Waves and Effective Properties in Materials Containing Inclusions.
Final rept.,
S. K. Datta, and H. M. Ledbetter. 1984, 17p
Prepared in cooperation with Colorado Univ. at Boulder.
Pub. in Proceedings of Conference on Wave Propagation in Homogeneous Media and Ultrasonic Nondestructive Evaluation, San Antonio, TX, June 17-21, 1984, p123-139.

Theoretically and experimentally, the authors studied plane-wave propagation in materials containing inclusions. The theory applies to any elastic inclusion in a homogeneous elastic isotropic matrix. Particles can be distributed homogeneously or nonhomogeneously. They assumed ellipsoid-shaped particles, oriented either randomly or aligned. Mainly they considered an SiC-particle-reinforced aluminum-alloy composite. But the authors give results also for a porous rock, where they consider both prolate-spheroid and oblate-spheroid voids. For all nine elastic constants, measurement and (nonhomogeneous) model agree within a few percent.

513,552
PB85-145449 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Method for Fabrication of Aluminum/Alumina Composites.
Final rept.,
B. F. Quigley, G. J. Abbaschian, R. Wunderlin, and R. Mehrabian. 1982, 8p
Pub. in Metallurgical Transactions, A: Physical Metallurgy and Materials 13A, n1 p93-100 Jan 82.

A new process was used to produce Al-Mg alloy composites containing discontinuous Al2O3 fibers. In the first step of the process, induced convection of the melt permits intimate contact between the fibers and the melt which invariably results in chemical interaction between the two. The presence of MgAl2O4 spinal on the fiber surface was confirmed. The composites produced contained randomly distributed fibers, and were further processed both to increase the volume fraction of fibers and to align them in two dimensions (planar random alignment). Examination of composite specimens fractured under tension indicated that the interfaces were strong enough to permit transfer of load from the matrix to the fiber. For example, modulus of elasticity and ultimate tensile strength of the alloy were improved approximately 50% and approximately 40% respectively by the addition of 23 v/o Al2O3 fibers.

513,553
PB85-854552/GAR PC N01/MF N01

National Technical Information Service, Springfield, VA.
Fillers for Plastics. November 1975-January 1985 (Citations from the Engineering Index Data Base).
Rept. for Nov 75-Jan 85.
Jan 85, 250p
Supersedes PB84-857945.

This bibliography contains citations concerning research and innovations in filler technology for thermoplastic and thermosetting composite materials. Calcium carbonate, talc, silica, clay, calcium sulfate, mica, glass beads, and alumina trihydrate are among the fillers examined relative to such considerations as magnetic properties, electric properties, impact resistance, radiation shielding, and flame retardancy. Considerations for processing filled thermoplastics are also included. (This updated bibliography contains 334 citations, 49 of which are new entries to the previous edition.)

11E. Fibers and Textiles

513,554

PB85-854727/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fibers and Textiles: Fire Resistance. December 1979-January 1985 (Citations from the Engineering Index Data Base).
Rept. for Dec 79-Jan 85.
Jan 85, 137p
Supersedes PB84-858307.

This bibliography contains citations concerning the preparation and flammability of flame resistant fibers and textiles. Flammability standards, testing, synthesis, safety factors of existing consumer products, flameproofing additives, and the durability of the product tested are included. (This updated bibliography contains 192 citations, 42 of which are new entries to the previous edition.)

11F. Metallurgy and Metallography

513,555

AD-A148 598/6/GAR PC **A14**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Materials Substitution and Recycling. Proceedings of the Meeting of the Structures and Materials Panel (57th) Held at Vimeiro, Portugal on 14-19 October 1983.
Conference proceedings.
Apr 84, 307p Rept no. AGARD-CP-356
For sales information of individual items see AD-P004 211 - AD-P004 229. Preface in French.

The Nature of the Critical and Strategic Materials Problem; Factors Affecting the Supply of Strategic Raw Materials with Particular Reference to the Aerospace Manufacturing Industry; Measures for Materials Conversation in Aero-engine Construction; Towards a Cycle Without Loss: Cobalt in the Aircraft Industry; Gas Turbine Engine Design Considerations as Related to Alloys of High Critical Element Content; Understanding the Roles of the Strategic Element Cobalt in Nickel Base Superalloys; Oxide Dispersion Strengthed Alloys; Substution and Conservation Technology for Chromium; Potential of Metal-Matrix Composties as Superalloy Substitutes; Manufacturing Developments to Reduce Strategic Materials Usage; Practical Implications of the Use of Aluminide Coatings for the Corrosion Protection of Superalloys in Gas Turbines; Coatings for Fuel Economy or Materials Substitution; The Navy Program to Develop Replacements for Critical and Strategic Materials; Ceramics as Substitutes for Scarce Materials; and New Developments in Materials Recycling by the US Bureau of Mines.

513,556

AD-A148 610/9/GAR PC **A09**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Metallurgical Engineering and Materials Science.
Effect of Microstructure and Trapping on the Hydrogen Embrittlement Susceptibility of a Ti-Bearing HSLA Steel.
Technical rept.,
M. Stevens, and I. M. Bernstein. Nov 84, 187p Rept nos. TR-19, CMU-036-099-19
Contract N00014-75-C-0265

The general hydrogen embrittlement susceptibility of a titanium-bearing HSLA steel has been characterized and correlated with detailed transmission electron and field ion microscopic studies of various microstructures. The hydrogen permeability and trapping in the same microstructures has also been studied through the use of electrochemical polarization and potentiostatic detection. The trapping character of the various microstructures has been determined by comparison with the TEM and FIM results. Hydrogen embrittlement susceptibility has been determined by the use of cathodically precharged cylindrical tensile specimens and hydrogen induced cracking of double cantilever beam type fracture mechanics specimens. The hydrogen permeability studies showed that austenitized and quenched microstructures were composed of essentially low interaction energy reversible trap sites for hydrogen including but not restricted to grain boundaries, solute elements and dislocations. Aging at temperatures between 400 deg C and 500 deg C still resulted in a reversible trap population, although the character of trapping was inferred to have shifted to higher capture-to-release rates from examination of the form of the transient hydrogen exit flux. The introduction of cementite in these microstructures was assumed to be responsible. At aging temperatures of 600 deg c and higher, irreversible trapping of hydrogen was found to occur concurrently with the direct precipitation of the alloy carbide, TiC.

513,557

AD-A148 670/3/GAR PC **A03**/MF **A01**
Michigan Technological Univ., Houghton. Dept. of Metallurgical Engineering.
Influence of Strain Rate and Porosity on the Deformation and Fracture of Titanium and Nickel.
Technical rept.,
P. E. Magnusen, P. S. Follansbee, and D. A. Koss.
Jul 84, 32p Rept no. TR-25
Contract N00014-76-C-0037
Prepared in cooperation with Los Alamos National Lab., NM.

The influence of strain rate on the tensile deformation and fracture behavior of powder-fabricated titanium and nickel containing porosity has been investigated. Measurements of the uniform strain, local fracture strains, and elongations to failure show that, over the range of strain rates from 0.0001 to 100 per 1/sec, there is little or no effect of the strain rate on the fracture behavior of these materials at any of the porosity levels studied. In contrast, increasing porosity causes significant decreases in the yield stress, strain-hardening exponent, and ductility; these effects are more pronounced in the titanium than in the nickel. The porosity-induced loss of ductility can be understood in terms of the combined effects of enhanced geometric softening and shear localization due to a network of imperfections introduced into the materials by the presence of porosity. Secondary effects due to hydrogen embrittlement and thermal gradients forming during deformation are also noted. (Author).

513,558

AD-A148 671/1/GAR PC **A02**/MF **A01**
Michigan Technological Univ., Houghton. Dept. of Metallurgical Engineering.
Influence of Hydrogen on the Multiaxial Fracture Behavior of Titanium Alloy Sheets.
Technical rept.,
B. J. Lograsso, R. J. Bourcier, and D. A. Koss. Jul 83, 10p Rept no. TR-24
Contract N00014-76-C-0037

The influence of hydrogen on the deformation and fracture of three Ti alloys in the form of sheet has been examined as a function of the state of stress. Unnotched sheet specimens of alpha-phase Ti (-60, 630, and 980 ppm H), Beta-phase Ti-30V (-40 and 2000 ppm H), and alpha-Beta Ti-6Al-4V (30, 240, and 500 ppm H) have been investigated over deformation paths ranging from uniaxial to equibiaxial tension. Based on the measurements of the local fracture strains, the alpha-Ti data show a decrease in ductility with increasing hydrogen content as the degree of biaxiality of the tensile strain increases. Thus hydrogen embrittlement of Ti sheet is most severe under equibiaxial straining. In contrast, there is no pronounced effect of stress state on the localized necking and fracture behavior of either the Ti-30V or the Ti-6Al-4V at any of the hydrogen levels/microstructures examined. The results indicate that, even in equibiaxial tension, Ti alloys in the form of sheet are immune to hydrogen embrittlement if hydrides do not form. If hydrides are present, the embrittlement is most pronounced under those state of stress (e.g., plane strain and equibiaxial tension) which are characterized by large normal stresses.

513,559

AD-A148 672/9/GAR PC **A03**/MF **A01**
Michigan Technological Univ., Houghton. Dept. of Metallurgical Engineering.
Deformation and Fracture of P/M (Powder/Metallurgy) Titanium Alloys.
Annual rept. 1 Oct 83-30 Sep 84,
D. A. Koss. 5 Nov 84, 26p Rept no. TR-27
Contract N00014-76-C-0037

Progress is reviewed for a research program whose purpose is to provide a broad-based understanding of the application and consequences of certain advanced processing techniques to high performance alloys in general and to Ti alloys in particular. The research ranges from experimental studies of hot isostatic pressing (HIP) to experimental/analytical modeling of the deformation and fracture of materials with pre-existing porosity. Aspects of the search are also a fundamental study of fracture utilizing engineering materials containing processing-induced defects. Progress for the period October 1, 1983 to September 30, 1984 is reviewed for the following portions of this research program: (1) the influence of porosity on the deformation and fracture of alloys over a wide range of strain rates; (2) the effects of void/pore distributions on ductile fracture as modeled by arrays of holes; (3) hot isostatic pressing of metallic powders; and (4) grain size/stress state effects on the hydrogen embrittlement of titanium. (Author)

513,560

AD-A148 766/9/GAR PC **A03**/MF **A01**
Michigan Technological Univ., Houghton. Dept. of Metallurgical Engineering.
Influence of Porosity on the Deformation and Fracture of Alloys.
Technical rept.,
R. J. Bourcier, D. A. Koss, R. E. Smelser, and O. Richmond. Nov 84, 36p Rept no. TR-26
Contract N00014-76-C-0037

The tensile deformation and fracture behavior of alloys containing rounded porosity and with differing levels of matrix strain hardening has been examined both experimentally and analytically. The stress-strain response in uniaxial tension and, to a limited extent, plane-strain tension has been determined at room temperature for powder-fabricated titanium, and Titanium-6 Aluminum-4 Vanadium containing porosity. The strength and the ductility of both alloys decrease substantially with increasing porosity level. A large strain elastoplastic finite element model based on a regular array of equal-sized spherical voids is used to predict bulk porosity effects; the analysis is in good agreement with the experimentally observed rates of void growth, but it underestimates the degradation of strength with increasing porosity. In an analysis unique to P/M alloys, the effects of porosity on a local scale are examined successfully by a continuum imperfection model which predicts the fracture of porous materials with differing matrix strain-hardening characteristics. The analysis is significant in that it implies that a primary effect of porosity on fracture is to introduce into the material a network of planes of high local pore content (imperfections).

513,561

AD-P004 211/9/GAR PC **A02**/MF **A01**
Rutgers - The State Univ., Piscataway, NJ. Dept. of Ceramics.
Nature of the Critical and Strategic Materials Problem,
J. B. Wachtman, Jr. Apr 84, 11p
This article is from the Proceedings of the Meeting of the Structures and Materials Panel (57th) Held at Vimeiro, Portugal on 14-19 Oct 83, AD-A148 598, p1-1 - 1-11.

The economies and national defense systems of the industrialized, market-economy countries depend on many imported raw materials. Some of these materials

are vital to the performance of advanced weapons or to basic production capacity such as machine tools. While no present shortage exists, the potential of supply interruptions requires national preparedness as a form of insurance. Adequate preparedness requires a multi-faceted strategy including the capability of short-term response, such as stockpiling, and longer term responses such as emergency substitution. Development of substitutes occurs normally only when a price or performance advantage is foreseen. Some substitutes are being developed through this natural economic process, but in other cases no direct economic motivation exists. Technically promising substitution development which could reduce vulnerability may require more deliberate and better organized government support. (Author)

513,562
AD-P004 212/7/GAR PC **A02/MF A01**
Durham Univ. (England). Dept. of Geography.
Factors Affecting the Supply of Strategic Raw Materials with Particular Reference to the Aerospace Manufacturing Industry,
E. W. Anderson. Apr 84, 20p
This article is from the Proceedings of the Meeting of the Structures and Materials Panel (57th) Held at Vimeiro, Portugal on 14-19 Oct 83, AD-A148 598, p2-1 - 2-20.

The study analyses the political and strategic factors affecting the supply of certain raw materials critical to the European NATO aerospace industry. For various reasons, including potential political instability, concentration of sources, small scale of production and technological-industrial problems, chromium, cobalt, hafnium, manganese, niobium, titanium, tungsten, and vanadium are all considered to a degree at risk. (Author)

513,563
AD-P004 213/5/GAR PC **A02/MF A01**
Motoren- und Turbinen-Union G.m.b.H., Munich (Germany, F.R.).
Measures for Materials Conservation in Aero-Engine Construction,
H. Huff, R. Graeter, and R. Froehling. Apr 84, 9p
This article is from the Proceedings of the Meeting of the Structures and Materials Panel (57th) Held at Vimeiro, Portugal on 14-19 Oct 83, AD-A148 598, p3-1 - 3-9.

Conservation of critical metals or their raw materials is generally sought in a number of ways: by substitution, i.e., either by lowering the critical alloy content in existing materials (leaning) or by developing alternative materials from cheaper raw materials which are readily available on a long-term basis; by the application of critical materials only where they are needed; by the application of near-net-shape manufacturing processes; by taking measures designed to extend the life of components; and by remelting scrap metal, accompanied by minimum possible downgrading. The present paper discusses specific measures for reducing waste and for extending life as applied to engine components. Some of the methods and techniques used toward this end were evolved with other purposes in mind (e.g., light-weight construction). It is nevertheless shown that appreciable savings in materials or gains in life can be achieved for engine parts and that the concepts employed can also readily be transferred to other areas.

513,564
AD-P004 214/3/GAR PC **A02/MF A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Stuttgart (Germany, F.R.).
Towards a Cycle without Loss. Cobalt in the Aircraft Industry,
C. Voigt. Apr 84, 7p
This article is from the Proceedings of the Meeting of the Structures and Materials Panel (57th) Held at Vimeiro, Portugal on 14-19 Oct 83, AD-A148 598, p4-1 - 4-7.

The flow cycle of cobalt in products used in the aircraft industry has been investigated. The manufacturing processes, uses and ultimate destinations of the materials containing cobalt (superalloys, ultra-high strength steels, tool steels and special alloys) have been quantitatively analyzed for the FRG. The ways in which cobalt is lost within the material cycle have been determined. Cobalt recovery rates for process scrap and obsolete scrap will be presented. It turns out that, ultimately, the dilution of cobalt in iron to a degree that it is of no value any more is the most important loss mechanism. A prime counter-action is improved scrap separation at all steps of the material cycle. The influence of no-scrap-technologies is discussed.

513,565
AD-P004 216/8/GAR PC **A02/MF A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Understanding the Roles of the Strategic Element Cobalt in Nickel Base Superalloys.
J. R. Stephens, and R. L. Dreshfield. Apr 84, 15p
This article is from the Proceedings of the Meeting of the Structures and Materials Panel (57th) Held at Vimeiro, Portugal on 14-19 Oct 83, AD-A148 598, p6-1 - 6-15.

The United States imports over 90 percent of its cobalt, chromium, tantalum and columbium -- all key elements in high temperature nickel-base superalloys for aircraft gas turbine disks and airfoils. NASA, through joint government/industry/university teams, has undertaken a long-range research program (COSAM - Conservation of Strategic Aerospace Materials) aimed at reducing or eliminating these strategic elements by examining their basic roles in superalloys and identifying viable substitutes. This paper discusses research progress in understanding the effects of cobalt and some possible substitutes on microstructure, mechanical properties, and environmental resistance of turbine alloys. (Author)

513,566
AD-P004 217/6/GAR PC **A02/MF A01**
Wiggin Alloys Ltd., Hereford (England).
Oxide Dispersion Strengthened Alloys,
G. A. J. Hack. Apr 84, 16p
This article is from the Proceedings of the Meeting of the Structures and Materials Panel (57th) Held at Vimeiro, Portugal on 14-19 Oct 83, AD-A148 598, p7-1 - 7-16.

The principle of oxide dispersion strengthening has been applied to precious metals, nickel, ferritic steels, aluminum alloys and superalloys. Conventional melting processes are unsuitable for the production of ODS alloys and alternative methods are required to incorporate oxides etc. into various base compositions. One of these methods, mechanical alloying is particularly appropriate to large scale commercialisation and can readily accommodate reactive alloying elements. The commercial production, properties and applications of ODS superalloys are described. The strength contribution of the oxides gives the alloy designer more freedom to optimise for oxidation and sulphidation resistance or to minimise the use of strategic metals; for example, the alloys described are all cobalt-free. (Author)

513,567
AD-P004 218/4/GAR PC **A02/MF A01**
Vanderbilt Univ., Nashville, TN.
Substitution and Conservation Technology for Chromium,
A. G. Gray. Apr 84, 11p
This article is from the Proceedings of the Meeting of the Structures and Materials Panel (57th) Held at Vimeiro, Portugal on 14-19 Oct 83, AD-A148 598, p8-1 - 8-11.

Chromium is a highly strategic and critical metal because of its significant import dependence and its essential uses for defense, energy and industrial products. It is used in such diversified applications as stainless steels and tool steels; alloy steels to provide hardenability in heat treatment, in air frames, and in landing gear; heat and corrosion resistant alloys; superalloys for jet engines; alloy cast iron; electroplating; and corrosion treatment for aluminum alloys. This paper presents information on application areas where substitution and conservation appear feasible in a supply crisis based on present available technology. Likewise, applications where research is needed to expand the substitution potential will be indicated. Opportunities for conservation and displacement with emerging technologies will be discussed. Finally, the value of an organized effort on substitution preparedness to gather and develop information on chromium substitution and conservation technology and have it ready as a contingency plan will be presented. (Author)

513,568
AD-P004 220/0/GAR PC **A02/MF A01**
Pratt and Whitney, West Palm Beach, FL. Government Products Div.
Manufacturing Developments to Reduce Strategic Materials Usage,
M. M. Allen, D. S. Halfpap, and M. A. Siegel. Apr 84, 8p
This article is from the Proceedings of the Meeting of the Structures and Materials Panel (57th) Held at Vimeiro, Portugal on 14-19 Oct 83, AD-A148 598, p10-1 - 10-8.

The worldwide shortages and price escalations of cobalt, titanium, tantalum and other key elements in the late 1970's instigated manufacturing development programs to reduce their usage in gas turbine engines. This paper describes several programs which provided significant results in reducing raw material requirements, that have been reduced to practice. The programs include forging and casting complex parts to near net shape, recycling of machining scrap and used parts, repair and refurbishment of damaged or worn parts, and component retirement for cause. In addition to reduction of strategic material usage, these programs have resulted in lower cost parts due to reduced material input requirements and less machining. (Author)

513,569
AD-P004 223/4/GAR PC **A02/MF A01**
Naval Material Command, Washington, DC.
Navy Program to Develop Replacements for Critical and Strategic Materials,
J. J. Kelly, and M. A. Kinna. Apr 84, 10p
This article is from the Proceedings of the Meeting of the Structures and Materials Panel (57th) Held at Vimeiro, Portugal on 14-19 Oct 83, AD-A148 598, p13-1 - 13-10.

In respone to the United States President's endorsement of research and development on critical and strategic materials (CSM), the Navy has initiated a program to develop design options for CSM in future weapon and platform systems. Key objectives of the program are: development of a data base, fabrication of materials and components, demonstration of hardware, and establishment of manufacturing process to provide reproducible materials and components. Four materials thrusts art addressed. They are: utilization of domestically abundant materials, development of domestic high temperature materials, evaluation of new materials and alloys, and conservation of critical materials.

513,570
AD-P004 225/9/GAR PC **A02/MF A01**
Card Corp., Denver, CO.
New Developments in Materials Recycling,
R. C. Horton, and C. B. Kenahan. Apr 84, 24p
This article is from the Proceedings of the Meeting of the Structures and Materials Panel (57th) Held at Vimeiro, Portugal on 14-19 Oct 83, AD-A148 598, p15-1 - 15-24.

This paper presents promising technical solutions to complex recycling problems such as recovery of cobalt, nickel, and chromium from superalloy scrap; the separation, recovery, and reuse of nickel and chromium from stainless and specialty steel wastes; precious metal recovery from electronic scrap; an environmentally acceptable method for recycling lead-acid batteries; recovery of nonferrous metals from scrap automobiles; and rapid scrap identification methods suitable for today's modern alloys.

513,571
AD-P004 227/5/GAR PC **A02/MF A01**
National Physical Lab., Teddington (England). Div. of Material Applications.
Trace Elements in Superalloys and the Implications for Recycling,
P. N. Quested, T. B. Gibbons, and G. L. R. Durber. Apr 84, 17p
This article is from the Proceedings of the Meeting of the Structures and Materials Panel (57th) Held at Vimeiro, Portugal on 14-19 Oct 83, AD-A148 598, p19-1 - 19-17.

The more efficient use of recycled foundry scrap or revert alloy presents an alternative to substitution as a means of conserving strategic raw materials and represents more efficient utilisation of valuable resources. A major difficulty is the inferior foundry performance of revert alloy which can result in hot tearing or unacceptable levels of microporosity so that recycled material has generally been used for the less critical components in the turbine. The present paper considers the

general problem of control and specification of impurity elements with particular attention to the situation relevant to recycled alloys and considers ther influence of certain impurities on microstructures and properties. It will be shown that there is scope for the improvement of specifications for impurity elements and that a better understanding of the relationship between casting conditions and microstructure is required for conventionally cast alloys.

513,572
AD-P004 228/3/GAR PC A02/MF A01
National Aeronautical Establishment, Ottawa (Ontario).
Trace Elements and Residual Elements in Superalloys.
R. T. Holt. Apr 84, 14p
This article is from the Proceedings of the Meeting of the Structures and Materials Panel (57th) Held at Vimeiro, Portugal on 14-19 Oct 83, AD-A148 598, p22-1 - 22-14.

This paper is a sequel to an earlier review (1) entitled Impurities and Trace Elements in Nickel Base Superalloys and covers work performed in this field from 1976 to present. Improvements in refinement technology are discussed. This includes evaluation of refractory materials to ensure minimal accumulation of inclusions. The following section on detrimental (or tramp) elements covers: (1) residual gases and porosity, (2) non-metallic inclusions (with particular emphasis on fatigue crack formation in inclusions which can lead to premature failure) and (3) residual elements such as sulfur, phosphorus and other tramp elements (primarily those in AMS 2260) which segregate to grain boundaries. Since this segregation can lead to intergranular fracture, these elements have been the subject of several studies by Auger Electron Spectroscopy (AES). There is also a section on beneficial elements which are added in small amounts to counteract the effect of the tramp elements. Some of those beneficial elements in small residual amounts may also help with grain size control. Finally, some recent work on the processing of scrap is discussed, with particular reference to minimizing the inclusion and trace element content of the alloys.

513,573
AD-P004 229/1/GAR PC A02/MF A01
Gesamthochschule Paderborn (Germany, F.R.).
Recycling Conform Design,
W. Jorden. Apr 84, 5p
This article is from the Proceedings of the Meeting of the Structures and Materials Panel (57th) Held at Vimeiro, Portugal on 14-19 Oct 83, AD-A148 598, p23-1 - 23-5.

The flow of materials in a real recycling system can be demonstrated in a simplified manner by a recycling model system. The analysis of this system results in additional new goals and guide lines for design. The guide lines are interpreted by examples showing how a product can be designed in a recycling conform manner, i.e. each product should be prepared in an optimal way for the eventual reuse of the whole product and, after the end of product life, for regaining the residue materials. The guide lines point out to the future, but can be realised in part even today without additional cost.

513,574
DE84002883/GAR PC A02/MF A01
Brookhaven National Lab., Upton, NY.
Effects of Phosphorus and Molybdenum on the Caustic Stress Corrosion Cracking of NiCrMoV Steels.
N. Bandyopadhyay, and C. L. Briant. 1984, 12p BNL-33842, CONF-841203-1
Contract AC02-76CH00016
International conference on fracture, New Delhi, India, 4 Dec 1984.
Portions are illegible in microfiche products.

This paper presents a study of the effects of phosphorus and molybdenum on caustic stress corrosion cracking of 3.5NiCrMoV rotor steels. The results show that phosphorus segregation to the grain boundaries substantially lowers the resistance of the steel to caustic cracking. Removal of molybdenum provides some improvement in the resistance to caustic cracking. (ERA citation 10:002593)

513,575
DE84006292/GAR PC A02
Sandia National Labs., Albuquerque, NM.
Corrosion Research of Alloys for Use in Nuclear Waste Disposal Canisters.
N. R. Sorensen, and R. B. Diegle. 1984, 11p SAND-83-2372C, CONF-841120-1
Contract AC04-76DP00789
Workshop on corrosion performance of nuclear fuel waste containers, Ottawa, Canada, 21 Nov 1984.
Paper copy only, copy does not permit microfiche production.

All tests involving the corrosion behavior of TiCode-12 (Ti-0.3Mo-0.8Ni) indicate that this alloy is a suitable choice for the containment of nuclear wastes. Although cracking was observed under conditions of hydrogen embrittlement, and pitting occurred in aggressive media, the conditions which produce these two failure modes represented severe overtests and are not expected in a repository. Both Mo and Ni increase the degree of corrosion resistance of Ti alloys. Mo changes the nature of the oxide, while Ni forms intermetallic precipitates which, through galvanic coupling, polarize the Ti into the passive region. All alternate alloys tested (including cast iron) exhibit acceptable corrosion behavior relative to their role as backup canister materials. In the case of cast iron, the material provides for a corrosion allowance design in contrast to the corrosion resistant design offered by Ti alloys. The effects of gamma irradiation still need to be adequately characterized. Research on such effects is underway at Sandia and the University of Minnesota. 11 references, 5 figures, 1 table. (ERA citation 10:004919)

513,576
DE85000416/GAR PC A02/MF A01
State Univ. of New York at Stony Brook. Dept. of Materials Science and Engineering.
Micromechanisms of Cleavage Behavior for Mo, Nb, and Mo-Nb Alloy Crystals as Probed by Synchrotron Radiation Topography.
A. B. Hmelo, J. C. Bilello, S. T. Davies, and D. K. Bowen. 1983, 16p DOE/ER/45098-4, CONF-830887-6
Contracts AC02-80ER10740, FG02-84ER45098
Joint meeting of American Crystallographic Association and Denver X-ray conference, Snowmass, CO, USA, 1 Aug 1983.

The fracture energy of Nb, Mo, and Mo-Nb alloys varies with composition when monocrystals are cleaved on the (001) plane at 77 degrees K. The subsurface microstructure in oriented (001) crystals of Nb, Mo, and equiatomic Mo-Nb was assessed using SXR fractography. The limited plastic response of Nb during cleavage crack propagation at 77 degrees K is explained as follows: mobile dislocations are driven to high velocities, undergoing a slip-to-twinning transition, and glissile dislocations are transformed into sessile products. The twins which form are those that relieve the tensile stresses. (ERA citation 10:002606)

513,577
DE85000426/GAR PC A03/MF A01
North Carolina State Univ. at Raleigh. Dept. of Materials Engineering.
Effect of Microstructure on Solid Particle Erosion in Multiphase Materials. Final Report, May 1983-February 1984.
H. Conrad, and R. O. Scattergood. 1984, 48p DOE/ER/45004-1
Contract AS05-83ER45004
Portions are illegible in microfiche products.

The program progress has accomplished the following: (1) relocation and setting up of a new laboratory for erosion research, which is to be used for the remainder of the program; (2) design, construction, and upgrading of equipment for the air blast type erosion apparatus; (3) extensive velocity calibrations for the erosion apparatus. This includes the design and implementation of a new calibration method. The new method provides a cross check on the more conventional double disc calibration method and, in addition, provides new information on the system performance in terms of velocity spread and other characteristics; (4) acquisition of the alloy systems to be used for the research. This includes the initial series of alloys for the Al-Si and WC-Co work and a unique alumina-stainless steel composite; (5) initiation of the metallographic work and erosion rate (weight-loss) measurements; and (6) initiation of a joint program with Argonne National Laboratory. (ERA citation 10:002584)

513,578
DE85000438/GAR PC A02/MF A01
Carnegie-Mellon Univ., Pittsburgh, PA.
Role of Passive Surface Films on Corrosion Fatigue Crack Initiation. Final Report, August 1, 1983-July 31, 1984.
I. M. Bernstein, A. W. Thompson, and G. W. Warren. Oct 84, 21p DOE/ER/45042-1
Contract AC02-83ER45042

The electrochemical behavior of the alloy in a passivating solution has been characterized. Electrochemical experimentation have yielded candidates for a passivating solution for mechanical testing and have given a qualitative idea of repassivation behavior. Fatigue test results have shown the necessity of controlling microstructure, specifically grain size. Design of new experimental equipment has reached the point where it is possible to isolate the reaction of interest from any interference. Analysis of the microstructural stability in the presence of dissolved hydrogen has correlated changes in slip behavior and precipitate coherency with changes in heat treatment and the possibility of the influence of hydrogen on the strain dependence of the coherent/semi-coherent transition as well as the details of the dislocation interaction with the strengthening precipitate. (ERA citation 10:002605)

513,579
DE85000447/GAR PC A03/MF A01
Sandia National Labs., Albuquerque, NM.
Effect of Mill Run and Temper Variations on Barrier Anodic Film Formation on 6061 Aluminum Alloy.
J. K. G. Panitz, D. J. Sharp, and F. E. Martinez. Oct 84, 36p SAND-83-1659
Contract AC04-76DP00789
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

We have evaluated the relationship between barrier anodic film formation and variations in the composition and microstructure of 6061-T6 aluminum alloy samples from three different mill runs. We also studied the characteristics of coatings formed on 6061 alloy samples with more extreme microstructure differences produced by two of heat treatment. The differences between the coatings formed on samples from the three different mill runs are small. Large differences occur in the processing characteristics and dielectric properties of coatings formed on heat-treated 6061 samples compared to the 6061-T6, as-received stock. Samples which have been heated to 500 exp 0 C and cooled slowly take substantially longer to process compared to 6061-T6 as-received stock, and 500 exp 0 C, rapid-quenched samples. The coatings on 500 exp 0 C, slow cooled samples display substantially inferior dielectric properties. The anodization characterisitcs of annealed vs work-hardened, pure aluminum samples which we studied the different coating characteristics displayed by the treated alloy samples are related to differences in the size and/or distribution of precipitates associated with the alloying components. (ERA citation 10:000913)

513,580
DE85000674/GAR PC A03/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Effect of Rhodamine-B on the Electrodepositon of Lead on Copper. Revision.
J. C. Farmer, and R. H. Muller. Sep 84, 43p LBL-17014-Rev., CONF-830508-28-Rev.
Contract AC03-76SF00098
163. Electrochemical Society meeting, San Francisco, CA, USA, 8 May 1983.

Rhodamine-B chloride (10 mu M) has been used as a model plating additive in a study of the electrodeposition of Pb from 1 M NaClO sub 4 , 0.5 and 5 mM Pb exp ++ (pH 3) on Cu. Ellipsometer measurements during cyclic voltammetry have shown that the addition of dye results in a more compact bulk deposit than obtained in its absence. It also prevents complete monolayer coverage during formation of the Pb underpotential deposit and shifts the bulk deposition peak to more cathodic potentials during the first potential cycle. Dye effects on potential and micromorphology disappear during subsequent cycling, but reappear after relaxation periods at open circuit. Depletion and readsorption of dye on the surface have been confirmed by spectroscopic ellipsometry. Different optical film models have been investigated for the interpretation of spectroscopic ellipsometer measurements by use of multidimensional analysis. 15 figures. (ERA citation 10:002623)

513,581

DE85000968/GAR PC A03/MF A01
Oak Ridge National Lab., TN.
Review of Mechanical Properties and Microstructures of Types 304 and 316 Stainless Steel after Long-Term Aging.
J. A. Horak, V. K. Sikka, and D. T. Raske. 1983, 35p
CONF-8310198-6
Contract AC05-84OR21400
IAEA specialists on mechanical properties of structural materials, Chester, UK, 10 Oct 1983.
Portions are illegible in microfiche products.

Because commercial liquid metal fast breeder reactors (LMFBRs) will be designed to last for 35 to 40 years, an understanding of the mechanical behavior of the structural alloys used is required for times of 2.2 to 2.5 x 10 exp 5 h (assuming a 70% availability factor). Types 304 and 316 stainless steel are used extensively in LMFBR systems. These alloys are in a metastable state when installed and evolve to a more stable state and, therefore, microstructure during plant operation. Correlations of microstructures and mechanical properties during aging under representative LMFBR temperature and loading conditions is desirable from the standpoint of assuring safe, reliable, and economic plant operation. We reviewed the mechanical properties and microstructures of types 304 and 316 stainless steel wrought alloys, welds, and castings after long-term aging in air to 9 x 10 exp 4 h (about 10-1/2 years). The principal effect of such aging is to reduce fracture toughness (as measured in Charpy impact tests) and tensile ductility. Examples are cited, however, where, because stable microstructures are achieved, these as well as strength-related properties can be expected to remain adequate for service life exposures. 27 figures. (ERA citation 10:002598)

513,582

DE85001265/GAR PC A05/MF A01
Oak Ridge National Lab., TN.
Metallography of Yesterday, Today and Tomorrow.
R. J. Gray, and G. Petzow. 1984, 83p CONF-8409174-1
Contract AC05-84OR21400
German metallography conference, Neu Ulm, F.R. Germany, 26 Sep 1984.
Portions are illegible in microfiche products.

This review begins briefly with early metallography and moves on to more recent developments in metallography, within the last 35 to 40 years: polishing methods, metallography in color, radiation metallography (of radioactive materials), magnetic etching, field metallography (in situ), metallography in failure analysis, and electron microscopy. Finally, future prospects are discussed. 77 references, 53 figures. (ERA citation 10:002600)

513,583

DE85001815/GAR PC A02/MF A01
State Univ. of New York at Stony Brook.
Chemisorption Theory: Adsorption on Copper-Nickel Alloys and Titanium Surface Embrittlement. Final Research Report, June 15, 1983-June 14, 1984.
J. L. Whitten. 1984, 8p DOE/ER/45021-2
Contract AC02-83ER45021
Portions are illegible in microfiche products.

The research is part of a theoretical program on the structure of molecules adsorbed on solid surfaces and dissociative chemisorption with emphasis on transition metal substrates. An embedding theory for treating chemisorption on metals will be applied to several systems involving titanium, copper, nickel and copper-nickel alloy substrates, and H sub 2 , H, CO, C and coadsorbed H and C adsorbates. (ERA citation 10:002603)

513,584

DE85002247/GAR PC A02/MF A01
Lawrence Livermore National Lab., CA.
Corrosion Behavior of Carbon Steels under Tuff Repository Environmental Conditions.
R. D. McCright, and H. Weiss. Oct 84, 9p UCRL-90875, CONF-841157-6
Contract W-7405-ENG-48
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1984.

Carbon steels may be used for borehole liners in a potential high-level nuclear waste repository in tuff in Nevada. Borehole liners are needed to facilitate emplacement of the waste packages and to facilitate retrieval of the packages, if required. Corrosion rates of low carbon structural steels AISI 1020 and ASTM A-36 were determined in J-13 well water and in saturated steam at 100 exp 0 C. Tests were conducted in air-sparged J-13 water to attain more oxidizing conditions representative of irradiated aqueous environments. A limited number of irradiation corrosion and stress corrosion tests were performed. Chromium-molybdenum alloy steels and cast irons were also tested. These materials showed lower general corrosion but were susceptible to stress corrosion cracking when welded. 4 references, 4 tables. (ERA citation 10:002638)

513,585

DE85002497/GAR PC A02/MF A01
Oak Ridge National Lab., TN.
1984 Model of Binary Alloy Solidification.
D. G. Wilson, V. Alexiades, and A. D. Solomon. 1984, 13p DOE/OR/21400-T61
Contract AC05-84OR21400
Portions are illegible in microfiche products.

A macroscopic mathematical model describing the idealized solidification of a mixture or binary alloy is presented. The formulation is global as a pair of conservation laws for mass and energy valid over the entire region. This generalizes the idea of coupling the separate equations for the diffusion of temperature and material. The problem is formulated in a weak or distributional sense. It is not required to explicitly track the interfacial region which may develop into a mushy region. Both problem formulation and numerical results are discussed. (ERA citation 10:002609)

513,586

DE85002524/GAR PC A02/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Estimated Cost of Stress Corrosion Cracking in Continuous Kraft Digesters Between 1980 and 1983 in the United States.
N. J. Olson. Oct 84, 8p PNL-SA-12425, CONF-8410188-1
Contract AC06-76RL01830
DOE workshop on corrosion in electrochemical systems, Seattle, WA, USA, 1 Oct 1984.

Using cracking statistics generated by two independent studies, estimated repair costs and estimated lost profits, the cost of stress corrosion cracking in continuous Kraft digesters was estimated for a three year period between late 1980 and early 1983. It was found from averaging the two studies, that 36% of the digester vessels had crack depths in excess of 0.25 inches and required structural repair (Class 1), 45% had crack depths less than 0.25 inches and did not require structural repair (Class 2), and 19% reportedly had no cracks at all (Class 3). Based on average repair costs and down time estimates, repair and lost profit costs in the United States were estimated to total in excess of a billion dollars for 110 vessels had good market conditions prevailed. This greater than $333 M/year loss is not only significant because of its size, but it is also greater than the estimated energy savings of $325 M/year associated with continuous versus batch digester operation. (ERA citation 10:002633)

513,587

DE85002684/GAR PC A04/MF A01
Sandia National Labs., Albuquerque, NM.
Cast-Iron Technology Status Report, September 1984.
G. W. Wellman. Sep 84, 67p SAND-84-1547
Contract AC04-76DP00789
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The results to date of an investigation of the deformation and fracture behavior of ductile cast irons with varying microstructures and chemistries are presented. The details of fracture toughness test methods, particularly at high loading rates are discussed. Finally, the plans for future work to confirm and clarify data already obtained and to obtain new information on ductile cast irons are listed. 38 figures, 26 tables. (ERA citation 10:002634)

513,588

DE85002691/GAR PC A03/MF A01
Lawrence Livermore National Lab., CA.
Effect on Work-Hardening in Dynamic Deformation of Beryllium.
D. J. Steinberg. Sep 84, 32p UCID-20243
Contract W-7405-ENG-48
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Results from Hopkinson split-bar, plate-impact, and cylinder deceleration experiments on beryllium are compared with hydrodynamic computer code simulations. By substantially increasing the beryllium work-hardening in the Steinberg-Guinan constitutive model, excellent agreement between the experiments and the calculations is achieved. In addition, the plate-impact experiments show that the Hugoniot is in excellent agreement with previous results, and that there is no evidence of any phase change up to 35 GPa. (ERA citation 10:002636)

513,589

DE85003158/GAR PC A02/MF A01
Lawrence Livermore National Lab., CA.
Pressure Phase Lines and Enthalpies for the alpha - beta and beta -Liquid Transitions in Beryllium.
A. Abey. 31 Oct 84, 15p UCRL-53567
Contract W-7405-ENG-48

The effect of hydrostatic pressure on the alpha - beta and beta -liquid transition temperatures in Be was measured in a gas pressure system. Differential thermal analysis was used in the pressure range from 0.1 MPa to 0.7 GPa. For the alpha - beta transition, dT/dP = 43 +- 7 K/GPa; for the beta -liquid transition, dT/dP = 35 +- 7 K/GPa. Although it is possible that large systematic errors may arise from experimental procedures, our results are seriously at odds with those of other investigators. Transition enthalpies for the alpha - beta and beta -liquid transitions were 1.9 +- 0.2 and 2.2 +- 0.2 kcal/g.m., respectively, at a pressure of 0.1 MPa. (ERA citation 10:002637)

513,590

DE85003175/GAR PC A04/MF A01
Stanford Univ., CA. Dept. of Materials Science and Engineering.
Study of the Microstructural Processes Which Control High Temperature Crack Growth. Final Progress Report, 1 August 1983-31 July 1984.
W. D. Nix. 1984, 72p DOE/ER/45024-T1
Contract AT03-83ER45024
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During the past year a number of basic experiments on creep crack growth in Cu and Cu + 1 wt % Sb at 500 exp 0 C have been conducted. The presence of Sb in the alloy facilitates brittle intergranular fracture at room temperature and permits a direct SEM study of intergranular cavities at the crack tip. Objective was to determine the conditions for steady state crack growth. Creep tests on Cu + 5 wt % Sn at a variety of stresses and temperatures confirm that this alloy is a class I solid solution. (ERA citation 10:002604)

513,591

N85-12125/7/GAR PC A02/MF A01
Materials Research Labs., Ascot Vale (Australia).
Weld Metal Solidification Cracking in a Carbon-Manganese Steel.
B. Dixon. 1984, 15p

Weld metal solidification cracking is a significant problem in the welding of steels. Extensive solidification cracking occurred during the fabrication of a steel pipeline which was supposed to be manufactured in accordance with stringent specifications. The cracks were first discovered on parts of the longitudinal welds where they abutted circumferential welds, and extensive metallography and electron microprobe analysis showed that they were associated with phosphorus enriched segregates. The pipes were subsequently inspected by the manufacturers and repaired. The object of the current investigation was to accurately define the cause of cracking in this instance so that potential problems in the welded construction of naval vessels might be avoided by control of weld process parameters and chemistry of the consumables.

513,592

N85-12129/1/GAR PC A02/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.

Effects of Tin on Microstructure and Mechanical Behavior of Inconel 718.
R. L. Dreshfield, W. A. Johnson, and G. A. Maurer. 1984, 13p NAS 1.15:86866, E-2329, NASA-TM-86866
Presented at the Tms-Aime Fall Meeting, Detroit, 17-20 Sep. 1984.

Columbium, for which the United States is 100 percent import reliant, is of strategic importance to the U.S. aerospace industry. A major amount of the Cb is used in Inconel 718. Should Cb sources be disrupted, it may be desired to use a grade of Cb melting stock having greater Sn content then the preferred vacuum rade. Additions of Sn to Inconel 718 were varied from none added to 1 wt %. The Sn additions below 800 ppm had no detrimental effects on 650 C stress rupture behavior; however, 1-wt % Sn severely degraded both life and ductility. Additions of Sn in excess of 200 ppm were slightly detrimental to the 425 C tensile yield strength and ductility. The Sn additions had no effect on the microstructure of Inconel 718 even after stress rupture testing for over 6000 hr at 650 C.

513,593
N85-12130/9/GAR PC **A04/MF A01**
Cincinnati Univ., OH.
High Temperature Low-Cycle Fatigue Mechanisms in Single Crystals of Nickel-Based Superalloy Mar-M 200.
Final Report.
W. W. Milligan, and N. Jayaraman. Oct 84, 59p NAS 1.26:174739, NASA-CR-174739
Grant NSG3-506

Twenty three high temperature low-cycle fatigue tests were conducted on single crystals of the nickel-based superalloy Mar-M 200. Tests were conducted at 760 and 870 C. SEM fractography and transmission electron microscopy were used to determine mechanisms responsible for the observed orientation dependent fatigue behavior. It has been concluded that the plastic characteristics of the alloy lead to orientation-dependent strain hardening and fatigue lives at 760 C. At 870 C, the elastic characteristics of the alloy dominated the behavior, even though the plastic strain ranges were about the same as they were at 760 C. This led to orientation-dependent fatigue lives, but the trends were not the same as they were at 760 C.

513,594
N85-12131/7/GAR PC **A02/MF A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Effects of Cr, CO, al, Mo and TA on the Cyclic Oxidation Behavior of a Prototype Cast Ni-Base Superalloy Based on a 2(5) Compoelte Statistically Desiigned Experiment.
C. A. Barrett. 1984, 20p NAS 1.15:83784, E-2280, NASA-TM-83784
Presented at the High Temp. Corrosion in Energy Systems 7, Detroit, 17 Sep. 1984; Sponsored by Aime and ASM.

A series of cast Ni-base superalloys were systematically varied at selected levels of Co, Cr, Mo, Ta, and Al. The elemental levels varied were Mo, 0 to 4 percent; Cr, 6 to 18 percent; Co, 0 to 20 percent, Ta, 0 to 8 percent; and Al, 3.25 to 6.25 percent. The cyclic oxidation resistance was determined from specific weight change data as a function of time for 1 hr cycles in static air at 1100 C. The significant terms in decreasing order of their importance were Al, Ta, Cr2, Al-Cr, Cr-Co, Co2, Al-Mo, Cr-Mo, Al-Al, and Mo-Ta. The Al term alone accounted for close to 82 percent of the explained variability. The estimating equation showed that the Al level was the most important and should be at its 6.25 wt % maximum value. The Mo and Ta levels should also be at their maximum 4 and 8 wt % respectively. The cobalt composition should be as low as possible, i.e., 0 wt%. The Cr level optimum varies depending on the other 4 levels. The X-ray diffaction results indicate the most protective scales are alumina/aluminate spinel stabilizized with a tri-rutile oxide high in Ta and Mo.

513,595
N85-12132/5/GAR PC **A02/MF A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Universal Binding Energy Relations in Metallic Adhesion.
J. Ferrante, J. R. Smith, and J. J. Rose. 1984, 14p NAS 1.15:86889, E-2354, NASA-TM-86889
Presented at the Materials Research Society Ann. Meeting, Boston, 27-29 Nov. 1984.

Rose, Smith, and Ferrante have discovered scaling relations which map the adhesive binding energy calculated by Ferrante and Smith onto a single universal binding energy curve. These binding energies are calculated for all combinations of Al(111), Zn(0001), Mg(0001), and Na(110) in contact. The scaling involves normalizing the energy by the maximum binding energy and normalizing distances by a suitable combination of Thomas-Fermi screening lengths. Rose et al. have also found that the calculated cohesive energies of K, Ba, Cu, Mo, and Sm scale by similar simple relations, suggesting the universal relation may be more general than for the simple free electron metals for which it was derived. In addition, the scaling length was defined more generally in order to relate it to measurable physical properties. Further this universality can be extended to chemisorption. A simple and yet quite accurate prediction of a zero temperature equation of state (volume as a function of pressure for metals and alloys) is presented. Thermal expansion coefficients and melting temperatures are predicted by simple, analytic expressions, and results compare favorably with experiment for a broad range of metals.

513,596
N85-12146/5/GAR PC **A02/MF A01**
UKAEA Atomic Energy Research Establishment, Harwell (England).
Diffusion of Cr-51 Tracer in Cr2O3 and the Growth of Cr2O3 Films.
A. Atkinson, and R. I. Taylor. Jun 84, 16p AERE-R-11314

The tracer self diffusion coefficient of Cr in-Cr2O3 single crystals was measured at temperatures of 1100 and 1300 C and for oxygen activities ranging from the Cr/Cr2O3 equilibrium to air. The dependence of D*(Cr) on a(O2) is consistent with diffusion by vacancies at high a(O2) and by interstitials at low a(O2). The activation energy of D*(Cr) in the vacancy region at constant a(O2) is 6.0 eV. All the tracer penetration profiles show a strong contribution from diffusion along dislocation, probably in the form of low angle boundaries. The present lattice diffusion coefficients are several orders of magnitude smaller than those of earlier studies which suggests that the earlier measurements were mainly controlled by short-circuit diffusion. The lattice diffusion coefficients are far too low to account for the rate of oxidation of Cr and it is concluded that grain boundary diffusion must be responsible for Cr2O3 film growth.

513,597
N85-12147/3/GAR PC **A02/MF A01**
UKAEA Atomic Energy Research Establishment, Harwell (England).
Diffusion of Fe-55 in Fe2O3 Single Crystals.
A. Atkinson, and R. I. Taylor. May 84, 25p AERE-R-11286

The diffusion of Fe55 was measured parallel to the c-axis of Fe2O3 single crystals at temperatures in the range 708 C to 1303 C and at an oxygen activity of unity. The tracer penetration profiles were determined using sectioning techniques. For temperatures above 900 C the tracer diffusion coefficient is given by D*(Fe) = 1.6 x 10 to the 9th power exp (-6.0(eV)/kT) sq cm/s and below 900 C by 2.8 x 10 to the -9th power exp (-1.8(eV)/kT). The high temperature behavior is probably characteristic of pure Fe2O3 whereas diffusion at lower temperatures may be influenced by impurities. The most likely defects responsible for diffusion of Fe are iron interstitials and, for oxygen, oxygen vacancies and the observed activation energies are discussed in terms of the properties of these defects. The diffusion data and defect models were used to predict the rate of growth of Fe2O3 and indicate that outward Fe diffusion is the dominenat transport process. Previously published data for Fe2O3 growth in a variety of experimental situations were corrected to a single rate constant using a model for multilayer growth.

513,598
N85-12149/9/GAR PC **A03/MF A01**
UKAEA Atomic Energy Research Establishment, Harwell (England).
Thermal Ageing Studies of 9%Cr 1%Mo Steel.
M. Wall, B. C. Edwards, and J. A. Hudson. Jan 84, 39p AERE-R-11109

The effects of thermal aging on the tensile and impact properties of a commercial 9%Cr 1%Mo steel. In a quenched and tempered condition, were studied. The corresponding grain boundary compositional changes were monitored using transmission electron microscopy. Complementary transmission electron microscopy studies showed significant microstructural changes were occurring during thermal aging and in particular the formation of Laves phase was noted at the lath and grain boundaries. The degradation observed in impact properties was not necessarily reflected in room temperature tensile tests, which were sensitive to grain boundary segregation effects only over a narrow aging regime. This behavior was explained in terms of line scale matrix precipitation followed by particle coarsening.

513,599
N85-12150/7/GAR PC **A04/MF A01**
UKAEA Atomic Energy Research Establishment, Harwell (England).
Stress-Driven Solute Enrichment of Crack-Tips During Low Ductility Intergranular Fracture of Low-Alloy Steel.
C. A. Hippsley, H. Rauh, and R. Bullough. Oct 83, 52p AERE-R-11120

The local distribution of solute chemistry in the vicinity of cracktips has been determined by scanning Auger spectroscopy in specimens of 2 1/2CrMo steel subject to controlled crack growth by low-ductility intergranular fracture at elevated temperatures. A significant enrichment of sulphur in such regions is shown to be associated with this type of fracture occurring most commonly in low-alloy steels which suffer from stress-relief cracking during post-weld heat treatment. Theoretical analysis of the migration to a crack of dissolved solute atoms, under the influence of the crack-tip stress field, is presented and used to provide a quantitative explanation of the observed sulphur segregation near the crack-tip. The importance of sulphur to the embrittlement process is thus confirmed.

513,600
N85-12151/5/GAR PC **A03/MF A01**
UKAEA Atomic Energy Research Establishment, Harwell (England).
Effects of Microstructure on the Temper Embrittlement Susceptibility of a Cr-2-1/4 1Mo Forging.
G. Gage, B. C. Edwards, and J. A. Hudson. Jan 84, 27p AERE-R-11110

A detailed metallurgical assessment of the microstructural stability and temper embrittlement susceptability of a 255 mm thick 2 1/4Cr 1Mo steel forging which was manufactured by a process typical of that used for the tube plates of steam generator units, was described. Aging effects were studied over the temperature range 450 to 575 C for times up to 20,000h. Grain boundary compositional changes were monitored using Auger Electron Spectroscopy (AES) and microstructural change determined by both transmission electron microscopy and X-ray analysis.

513,601
N85-12152/3/GAR PC **A03/MF A01**
UKAEA Atomic Energy Research Establishment, Harwell (England).
Acoustic Emission Monitoring of Fatigue in 7010 Aluminum Alloys.
G. Weatherly, J. M. Titchmarsh, and C. B. Scruby. Mar 84, 43p AERE-R-11167

The acoustic emission (AE) was monitored in testpieces of 7010 aluminium alloy containing growing fatigue cracks. Both high purity and commercial casts were studied in underaged, peak and overaged conditions, using tension-tension fatigue with R=0.1 and 0.5, at crack growth rates in the range 0.1 to 3 microns/cycle. The reduction of grip noise and discrimination of AE events with sources distant from the plane of the crack were achieved by careful design of testpiece geometry and clamping, and by the use of two broadband point transducers with calibrated response. Analysis of the load distributon at which AE events occurred at the crack plane showed that most events occurred near peak loading. However, the frequency of detected AE events was sometimes greatly reduced by adding oil to the crack, implying that crack face rubbing was one source of emission. The frequency of events remaining after the removal of rubbing signals was shown to be consistent with the size of the plastic zone at the crack tip, the rate of cack growth and the inclusion size/density distribution. It is estimated that the fracture of inclusions of area greater than 40 sq microns could be detected by the testing system.

513,602
N85-12153/1/GAR PC A02/MF A01
UKAEA Atomic Energy Research Establishment, Harwell (England).
Expert Systems: The Application of New Computer Methods to Corrosion Problems.
I. F. Croall, C. Westcott, G. P. Marsh, S. Patel, and J. N. Wanklyn. May 84, 14p AERE-M-3395

Current developments in information technology, database management and knowledge engineering give the possibility of pulling together corrosion expertise and data from many sources into a so-called Expert System for corrosion studies. A general explanation of expert system is presented and how such a system for corrosion prediction and evaluation might be put together is discussed.

513,603
N85-12154/9/GAR PC A03/MF A01
UKAEA Atomic Energy Research Establishment, Harwell (England).
Study of Precipation and Boron Distribution in 20Cr 25Ni Base Stainless Steels.
C. K. Bullough, J. K. Jenkins, and C. A. English. Mar 84, 27p AERE-M-3353

The effect of alloying additions and heat treatment on the microstructural distribution of boron was studied. Eight alloys were investigated, low boron (2 wppm) and high boron (containing nominally 300 wppm) versions of a ternary; unstabilized; niobium stabilized and titanium stabilized stainless steels containing 25wt%Cr, 25wt%Ni. These alloys were investigated in the solution treated and in the aged condition by boron autoradiography, optical microscopy, and by transmission electron microscopy techniques. It was found that the distribution of boron within the microstructure could be affected by both alloying addition and heat treatment. The alloys with boron additions had boron segregation to and precipitation at the grain boundaries following solution treatment, whilst those that were boron free generally did not. These observations are related to the kinetics of nonequilibrium boron segregation and to the association of boron with certain precipitate types. The precipitation in aged specimens was also affected by boron: in the unstabilized alloy and stabilized alloys it was heavier. Where M23C6 was precipitated boron caused a marked increase in matrix precipitation.

513,604
N85-12162/2/GAR PC A07/MF A01
Case Western Reserve Univ., Cleveland, OH.
Analysis Techniques for Tracer Studies of Oxidation.
M. S. Thesis Final Report.
S. N. Basu. Nov 84, 127p NAS 1.26:174796, NASA-CR-174796
Contract NAG3-324

Analysis techniques to obtain quantitative diffusion data from tracer concentration profiles were developed. Mass balance ideas were applied to determine the mechanism of oxide growth and to separate the fraction of inward and outward growth of oxide scales. The process of inward oxygen diffusion with exchange was theoretically modelled and the effect of lattice diffusivity, grain boundary diffusivity and grain size on the tracer concentration profile was studied. The development of the tracer concentration profile in a growing oxide scale was simulated. The double oxidation technique was applied to a FeCrAl-Zr alloy using O-18 as a tracer. SIMS was used to obtain the tracer concentration profile. The formation of lacey oxide on the alloy was discussed. Careful consideration was given to the quality of data required to obtain quantitative information.

513,605
N85-12383/4/GAR PC A06/MF A01
Centre d'Essais Aeronautique de Toulouse (France).
Essais de Traction de Tenacite et de Propagation de Fissure sur Alliages d'Aluminium des Series 2000 et 7000 Sous Forme de Produits Lamines et Forges. Proces Verbal de l'Essai No. M2-678300 (Tensile and Crack Propagation Tests on Aluminum Alloys of the 2000 and 7000 Series in Laminated Plate and Forged Products).
13 Jun 84, 105p M2-678300
Text in French.

Tensile and fatigue tests were carried out as a part of a characterization program of aircraft construction materials. The analysis of the results shows an influence of plate width on the mechanical characteristics. Microphotographs are presented to illustrate the fracture characteristics and the crack propagation.

513,606
N85-12384/2/GAR PC A02/MF A01
Centre d'Essais Aeronautique de Toulouse (France).
Ta6zr5d (Imi 685) Complement de Caracterisation en Deformation Imposee (Eprouvettes Prelevees dans UN Roust Forge). Proces Verbal de l'Essai No. M4-458700 (The Ta6zr5d (Imi 685) Characterization in Strain Controlled Tests. (Specimens Obtained from a Forged Spinning Wheel) No. M4-45870).
8 Jun 84, 22p M4-45870
Text in French.

Low cycle strain controlled fatigue tests were performed on 16 specimens of the IMI 685 alloy in order to select the construction material for aircraft engine parts. The results show fatigue characteristics which are clearly lower than those corresponding to the IMI 679 alloy. The difference at 10000 cycles is 100 MPa at 200 C and 200 MPa at 425 C.

513,607
N85-12388/3/GAR PC A03/MF A01
UKAEA Atomic Energy Research Establishment, Harwell (England).
Stress Relief Cracking Studies of 2 1/4Cr1Mo Steel.
C. A. Hippsley, and B. C. Edwards. Jan 84, 30p AERE-R-11111

The stress relief cracking susceptibility of coarse grained heat affected zone microstructures of 2 1/4 Cr 1Mo steel has been assessed using a recently developed constant displacement stress relief cracking test procedure. Two types of test are described: the relaxation test which simulates conditions of stress, strain and temperature during the post weld heat treatment cycle, and the load shedding test which characterizes crack growth behavior in terms of the stress intensity parameter at constant temperatures in the stress relief thermal cycle. Particular attention has been directed at characterizing the micromechanisms of cracking and the role of residual impurities. Two distinct types of stress relief cracking were identified: failure at high temperatures, 875K, was characterized by intergranular ductile microvoid coalescence, whereas at lower temperatures, 725K-875K, a low ductility intergranular failure was produced with the cracking promoted by solute segregation to the grain boundaries and the crack tip region. An increase in the heating rate during the post weld heat treatment was shown to be beneficial to cracking resistance. The application of the laboratory test data to the prediction of stress relief cracking of actual weldments is considered, using two alternative methods.

513,608
PB85-137297/GAR PC E04/MF E04
Avions Marcel Dassault-Breguet Aviation, Saint-Cloud (France).
Comparaison de la Resistance a la Fatigue (Initiation, Propagation) du TA6V de Fonderie avec le TA6V Corroye (Comparison between Fatigue Strength (Initiation, Propagation) of the Foundry TA6V and the Welded TA6V).
25 Jun 84, 71p DGT-25.369
Text in French.

The welded TA6V, in the presence of a hole exhibits a better behavior than the cast TA6V in initiation fatigue at 2.106 cycles, the gain on admissible stress being 36%. The 30 NCD 16 deposit on the axis and the assembly configurations in the TA6V assure the greatest longevity of assemblies in fatigue. An additional study should be anticipated with respect to the assembly conditions: determination of interference and of maximum play.

513,609
PB85-139061/GAR PC E03/MF E03
Oxford Univ. (England). Dept. of Engineering Science.
Discussion of Problems Encountered in the Dynamic Fracture Toughness Testing of Materials,
R. S. J. Corran, F. G. Benitez, J. Harding, and C. Ruiz. 1984, 11p OUEL-1524/84

The response of compact tension specimens to impact wedge loading at the pins is monitored. The effect of friction on the determination of pin load and of notch geometry on the establishment of quasi-static equilibrium in the specimen is determined and the validity of the technique for measuring dynamic fracture toughness is discussed.

513,610
PB85-139970 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Temperature Dependence of the Tensile Yield Strength of Selected Austenitic Steels.
Final rept.,
R. P. Reed, and J. M. Arvidson. 1984, 8p
Pub. in Advances in Cryogenic Engineering 30, p263-270 1984.

The trend toward the use of higher field superconducting magnets is creating the need for strong, tough structural materials to restrain the high magnetic forces. Austenitic and high-nitrogen-austenitic stainless steels are considered for such uses because of their high strength and good toughness, combined with high Young's modulus and low thermal conductivity. Study of the temperature dependence of tensile flow strength, including the 0.2 percent offset yield strength, leads to better understanding of deformation mechanisms in these face-centered cubic, polycrystalline alloys. The tensile properties of five austenitic Fe-Cr-Ni and Fe-Cr-Mn steels were measured. In these steels the Cr contents varied from 4.67 to 24.8 wt. percent; the nickel from 0.8 to 20.8 wt. percent; and the manganese from 1.7 to 21.79 wt. percent. Yet it is demonstrated that all steels primarily obtained their low temperature yield strength from carbon and nitrogen.

513,611
PB85-140002 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Ultrasonic Shear Wave Measurements of Known Residual Stress in Aluminum.
Final rept.,
G. V. Blessing, N. N. Hsu, and T. M. Proctor. Sep 84, 5p
Pub. in Experimental Mechanics 24, n3 p218-222 Sep 84.

Ultrasonic shear wave time-of-flight measurements were made at a nominal frequency of 4 MHz on a shrink-fit disk sample of 2024 aluminum alloy. The stress state of the sample was produced by shrink-fitting a plug and ring to produce a calculated 65 MPa region of uniform compression in the plug, and a concomitant non-uniform tension and compression in the ring. Time-of-flight measurement scans across sample diameters were made using a piezoelectric shear transducer with a viscous couplant, and repeated using a contactless electromagnetic acoustic transducer. The ultrasonic results were then compared with elasticity theory, assuming the acousto-elastic relationship between sound velocity and material strain.

513,612
PB85-140556/GAR PC E04/MF E04
Avions Marcel Dassault-Breguet Aviation, Saint-Cloud (France).
Examen Micrographique et Fractographique sur les Alliages 2214 et 2024 pour des Conditions de Mises en Solution Pouvant Entrainer la Brulure du Metal (Micrographic and Fractographic Examinations on Alloys 2214 and 2024 for Beginning-Solution Conditions, Capable of Leading to Metal Burning).
22 Aug 84, 66p DGT-23.419
Text in French.

The burning phenomenon in series 2000 sheet metal appears quite suddenly for solution-start temperatures scarcely higher than the maximum tolerated by the standards. The mechanical traction and fatigue properties are maintained on the three grades to the burning threshold: 510C for the 2214 and 500C for the 2024. Between 510C and 515C for the 2214 and between 500C and 505C for the 2024, we notice the first signs of burn. The investigation of a non-destructive method with Foucault eddy currents made it possible to establish that electric conductivity drops in inverse proportion to the temperature of starting solution, but the critical values obtained on three gradations are not applicable for sheet metal control because the blocks used in the study were not representative of sheets (different number of solution starts and especially different dimensions).

513,613
PB85-142800 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Aging Process in Aluminum-Alloy 2024 Studied by Means of Eddy Currents.
Final rept.,
M. Rosen, L. Swartzendruber, E. Horowitz, S. Fick, and R. Mehrabian. 1982, 8p
Pub. in Materials Science and Engineering 53, n2 p191-198 1982.

The influence of precipitation kinetics during aging of 2024 aluminum alloy on electrical conductivity, as measured by eddy currents, and on hardness was investigated. Aging temperatures between 21 and 190C were used and measurements were made on both unstretched and plastically deformed (3 percent permanent strain) samples. The two techniques, electrical conductivity and hardness, respond in a complementary manner to the varying microstructures that form during different phases of the aging process.

513,614
PB85-142826 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Comparison of Four Microindentation Hardness Test Methods Using Copper, 52100-Steel, and an Amorphous Pd-Cu-Si Alloy.
Final rept.,
P. J. Blau. 1983, 18p
Pub. in Metallography 16, n1 p1-18 1983.

Microhardness numbers obtained with Knoop and Vickers diamond indenters can be greatly affected by the nature of indenter/test piece interactions. The values obtained by traditional methods of microhardness calculations, using optical measurement of impression dimensions, can be misleading unless these interactions are taken into account. Using microhardness data for large-grained Cu, fine grained bearing steel (SAE 52100), and an amorphous ('glassy') metal alloy of Pd-Cu-Si, the effects of microstructure on microhardness numbers at various loads are explored. Four methods of measurement are used: (1) standard Knoop number (long impression diagonal), (2) standard Vickers number (average of two impression diagonals), (3) a modified Knoop number (long and short impression diagonals), and (4) direct impression area measurement by an electronic image analyzing system.

513,615
PB85-143527 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Heat Flow during Rapid Solidification of Undercooled Metal Droplets.
Final rept.,
C. G. Levi, and R. Mehrabian. 1982, 14p
Pub. in Metallurgical Transactions, A: Physical Metallurgy and Materials Science 13, n2 p221-234 Feb 82.

The solidification of undercooled spherical droplets with a discrete melting temperature is analyzed using both a Newtonian and a non-Newtonian (Enthalpy) model. Relationships are established between atomization parameters, the growth kinetics, the interface velocity and undercooling, and other important solidification variables. A new mathematical formulation and solution methodology is developed for non-Newtonian solidification of an undercooled droplet. An enthalpy model is used to model the solidification process in an undercooled droplet from a single nucleation event occurring at its surface. A superimposed bispherical (rotational bipolar) coordinate system is used. Numerical solutions for the solidification of pure aluminum droplets based on the enthalpy model are developed, and their results are compared to the trends predicted from the Newtonian model.

513,616
PB85-143543 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Microstructures of Rapidly Solidified Aluminum Alloy Submicron Powders.
Final rept.,
C. G. Levi, and R. Mehrabian. 1982, 11p
Pub. in Metallurgical Transactions, A: Physical Metallurgy and Materials Science 13, n 1 p13-23 Jan 82.

The microstructures of electron transparent submicron aluminum alloy powders produced by an electrohydrodynamic process are described. The observations are coupled with thermodynamic, kinetic and heat flow concepts to deduce the thermal history and solidification mode of the powders. The range of microstructures observed include: homogeneous plane front solidified single crystals; cellular crystals; and powders containing blocky segregates, multiple grains and twins.

513,617
PB85-144400 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Effect of Passivation and Passivation Defects on Electromigration Failure in Aluminum Metallization.
Final rept.,
H. A. Schafft, C. D. Younkins, T. C. Grant, C. Y. Kao, and A. N. Saxena. 1984, 6p
Pub. in Proceedings of 1984 Reliability Physics Symposium, Las Vegas, NV., April 3-5, 1984 p250-255.

Metal line structures with intentional defects in the passivation, to simulate cracks or pin holes, were used in electromigration studies. Results show that the stress changes in the metallization caused by these defects are not as important as the restraining action of the passivation in affecting a metallization's resistance to electromigration failure. Also, the observed effects of restorative forces acting on the metallization suggests that continuous monitoring for open-circuit failure may be necessary to obtain an accurate measure of the mean-time-to-failure.

513,618
PB85-145233 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Review of Our Present Understanding of Macrosegregation in Axi-Symmetric Ingots.
Final rept.,
S. D. Ridder, R. Mehrabian, and S. Kou. 1981, 24p
Pub. in Proceedings of Symposium Modeling of Casting and Welding Processes, Rindge, NH., August 3-8, 1980, p261-284 1981.

Our present understanding of the mechanisms responsible for certain types of macrosegregation occurring in ESR, VAR and continuous cast ingots are reviewed. Experimental observations on both a high temperature alloy Ni-27 wt.% Mo and low temperature Sn-Pb alloys are compared to theoretical predictions. The mathematical models developed extend previous work by coupling the convective heat and fluid flow in the fully liquid metal pool above the liquidus isotherm to the interdendritic fluid flow responsible for macrosegregation.

513,619
PB85-854719/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Alloying Effects of Palladium. May 1983-January 1985 (Citations from the Metals Abstracts Data Base).
Rept. for May 83-Jan 85.
Jan 85, 72p
Supersedes PB84-858984.

This bibliography contains citations concerning alloying effects of palladium. Topics include alloying elements, magnetic and physical properties, temperature and pressure effects, and corrosion resistance. Mechanical and surface properties, metallic glasses, impurity and composition effects, curie temperature, and superconductivity are included. (This updated bibliography contains 92 citations, 20 of which are new entries to the previous edition.)

11H. Oils, Lubricants, and Hydraulic Fluids

513,620
N85-12354/5/GAR PC **A06**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Microscopic Aspects of the Effect of Friction Reducers at the Lubrication Limit.
Ph.D. Thesis.
J. L. Mansot. Jun 84, 102p NAS 1.15:77413, NASA-TM-77413
Contract NASW-3541
Transl. into English of "Aspects Microscopiques de l'Action des Reducteurs de Frottement en Lubrification Limite" Lyon, 1982 140 p. Transl. by Kanner (Leo) Associates, Redwood City, CA. Original Document Prep. by Ecole Centrale de Lyon.

An attempt is made to analytically model the physicochemical properties of lubricants and their capacity to reduce friction. A technique of frozen fracturing of the lubricants was employed to study the dispersion of additives throughout a lubricant. Adsorption was observed at the liquid-solid interface, which was the region where the solid and lubricant met, and the molecular dispersion of the additive enhanced the effectiveness of the lubricant. The electrically conductive characteristics of the lubricant at the friction interface indicated the presence of tunneling effects. The Bethe model was used to examine the relationship between the coefficient of friction and the variation of interface thickness. The electron transport permitted an inelastic tunnel electron spectroscopic investigation of the molecular transformations undergone by the additive during friction episodes.

513,621
PB85-854404/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Composite Tribological Materials. May 1983-January 1985 (Citations from FLUIDEX Data Base).
Rept. for May 83-Jan 85.
Jan 85, 72p
Supersedes PB84-860592.

This bibliography contains citations concerning the properties, behavior, and uses of composite tribological materials in and on various objects, devices, and equipment. Friction and wear characteristics, mechanisms, and performance of these materials and the objects to which they are applied; such as, bearings, gears, and piston rings; are considered. Included are self lubricating materials, friction materials, and wear resistant materials. (This updated bibliography contains 106 citations, 30 of which are new entries to the previous edition.)

513,622
PB85-854735/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Synthetic Lubricants. November 1982-January 1985 (Citations from the Engineering Index Data Base).
Rept. for Nov 82-Jan 85.
Jan 85, 82p
Supersedes PB84-859255.

This bibliography contains citations concerning the research, development, testing, and applications of various synthetic lubricants. A description of the production of synthetic oils and crude oils is also included. Performance evaluations are discussed relative to various applications. (This updated bibliography contains 100 citations, 24 of which are new entries to the previous edition.)

11I. Plastics

513,623
AD-A148 791/7/GAR PC **A03**/MF **A01**
Aerospace Corp., El Segundo, CA. Space Sciences Lab.
Long-Term Light Induced Changes in Dark Conductivity of Kapton.
Technical rept.,
M. S. Leung, M. B.Tueling, and P. F. Mizera. 28 Sep 84, 38p TR-0084(4508-10)-1, SD-TR-84-41
Contract F04701-83-C-0084

The light-induced increase in dark conductivity of Kapton in space and simulated space environments has been investigated. It was found that a long-term increase in conductivity is caused by an accumulation of electrically active centers generated by solar radiation in the bulk material, if maintained in a vacuum. An analysis of the increase in conductivity as a function of light exposure time indicates that the dark conductivity of Kapton can be raised to a level where the film can become sufficiently conductive to be antistatic by simply exposing it to solar radiation in orbit.

513,624
DE85002343/GAR PC A02/MF A01
Los Alamos National Lab., NM.
Simple EOS for Linear Polytetradeuteroethylene.
F. Dowell. Sep 84, 15p LA-10241-MS
Contract W-7405-ENG-36
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A simple equation of state (EOS) for linear polytetradeuteroethylene (PTDE), with initial state density rho sub 0 = 1.093 g/cm exp 3 , was generated and added to the T-4 Sesame EOS Library as material number 7230. This EOS reproduces the experimental shock Hugoniot data for PTDE and for isotopically scaled linear polyethylene. (ERA citation 10:002763)

513,625
DE85002526/GAR PC A02/MF A01
Monsanto Research Corp., Miamisburg, OH. Mound.
Characterization and Adhesive Bonding of Poly(Etheretherketone) Resins and Composites.
R. B. Whitaker, A. Attalla, D. B. Sullenger, P. S. Wang, and J. V. Dichiaro. 1984, 15p MLM-3164(OP), CONF-841055-5
Contract AC04-76DP00053
16. national SAMPE technical conference on materials and processes, Albuquerque, NM, USA, 9 Oct 1984.
Portions are illegible in microfiche products.

Characterization and adhesive bonding studies of Poly(etheretherketone) (PEEK), produced by ICI, Ltd., have been conducted in relation to its use in wire coatings and in fiberglass-filled molding compounds at Mound. Thermal analyses have shown several PEEK resins to have essentially the same T/sub g/ and T/sub m/ values, indicating the same starting PEEK polymer was used. Differential scanning calorimetry (DSC) annealing studies showed the development of a second melting endotherm (or a shoulder of the first) after annealing above T/sub g/. Both x-ray diffraction and DSC data indicate the degree of crystallinity of melt-processed PEEK or PEEK-fiberglass (FG) (i.e., extruded or molded) to be low (less than or equal to 15%), but an unprocessed PEEK resin powder was approx. 35% crystalline. Chemical and spectroscopic analyses (elemental, Fourier Transform-Infrared (FT-IR), C-13 nuclear magnetic resonance (NMR), x-ray photoelectron spectroscopy (XPS)) support the predominant (i.e., 100% or nearly so) structural repeat unit of PEEK as being (O-phi-O-phi-CO-phi-) (where phi = benzene). Molecular weights of two PEEK resins were determined by light scattering, in 95% H sub 2 SO sub 4 , to be 123,000 and 73,000, after correction for anisotropy, due to its rod-like conformation. The critical surface tension of molded PEEK (neat) was determined by contact angle measurements to be approx. 36 to 39 dynes/cm, indicating PEEK to be a moderately low surface energy solid. However, acceptable bondability can be obtained for several adhesives following modification/activation of the PEEK surface, particularly by sanding or oxygen plasma treatment. (ERA citation 10:002764)

513,626
N85-12063/9/GAR PC A03/MF A01
Celanese Research Co., Summit, NJ.
Thermoplastic-Carbon Fiber Hybrid Yarn.
M. E. Ketterer. Nov 84, 30p NAS 1.26:3849, NASA-CR-3849
Contract NAS1-15749

Efforts were directed to develop processing methods to make carbon fiber/thermoplastic fiber preforms that are easy to handle and drapeable, and to consolidate them into low void content laminates. The objectives were attained with the development of the hybrid yarn concept; whereby, thermoplastic fiber can be intimately intermixed with carbon fiber into a hybrid yarn. This was demonstrated with the intermixing of Celion 3000 with a Celanese liquid crystal polymer fiber, polybutylene terephtalate fiber, or polyetheretherketone fiber. The intermixing of the thermoplastic matrix fiber and the reinforcing carbon fiber gives a preform that can be easily fabricated into laminates with low void content. Mechanical properties of the laminates were not optimized; however, initial results indicated properties typical of a thermoplastic/carbon fiber composites prepared by more conventional methods.

513,627
N85-12096/2/GAR PC A03/MF A01
Kentron International, Inc., Hampton, VA.
Chemoviscosity Modeling for Thermosetting Resins - I.
Final Report.
T. H. Hou. Nov 84, 40p NAS 1.26:172443, NASA-CR-172443
Contract NAS1-16000

A new analytical model for chemoviscosity variation during cure of thermosetting resins was developed. This model is derived by modifying the widely used WLF (Williams-Landel-Ferry) Theory in polymer rheology. Major assumptions involved are that the rate of reaction is diffusion controlled and is linearly inversely proportional to the viscosity of the medium over the entire cure cycle. The resultant first order nonlinear differential equation is solved numerically, and the model predictions compare favorably with experimental data of EPON 828/Agent U obtained on a Rheometrics System 4 Rheometer. The model describes chemoviscosity up to a range of six orders of magnitude under isothermal curing conditions. The extremely non-linear chemoviscosity profile for a dynamic heating cure cycle is predicted as well. The model is also shown to predict changes of glass transition temperature for the thermosetting resin during cure. The physical significance of this prediction is unclear at the present time, however, and further research is required. From the chemoviscosity simulation point of view, the technique of establishing an analytical model as described here is easily applied to any thermosetting resin. The model thus obtained is used in real-time process controls for fabricating composite materials.

513,628
N85-12177/0/GAR PC A04/MF A01
Kabelmetal Electro G.m.b.H., Hanover (Germany, F.R.).
Optimizing Conductive Polymer Compounds.
Final Report, Dec. 1982.
H. U. Voigt, and F. Hanisch. Jul 84, 61p BMFT-FB-T-84-145
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The composition of extrudable semiconducting compounds was optimized concerning electrical conductivity, behavior during extrusion and mechanical properties. To increase the electrical conductivity of polymer compounds carbon black is added. The best dispersion of carbon black is achieved using a continuously working mixing device and adding the filler after the polymer is in its molten state. Using electrical tests with model cables, a correlation is found between the statistical breakdown values, and the material composition and processing parameters of the semiconducting layer.

513,629
PB85-149771/GAR PC A03/MF A01
Northwestern Univ., Evanston, IL.
Structural Basis for the Mechanical Properties of Polyethlenes.
Final rept. Dec 81-May 84,
S. H. Carr, B. Crist, and T. J. Marks. Sep 84, 40p GRI-84/0171
Contract GRI-5081-260-0538
See also PB83-217851.

The physical properties of polyethylene, the material used in gas distribution pipes and fittings, are ultimately determined by the nature of the polymer molecules in the resin used for pipe manufacture. This relation between molecular structure and properties is based on the morphology formed in the polyethylene by a particular processing history. Model polyethylenes having a very narrow molecular weight distributions and well defined levels of short chain branching and long chain branching have been used to quantify the effects of mechanical behavior, especially those related to fracture. Tensile deformation of unnotched and notched samples was done to assess the relevant tensile and fracture toughness parameters. It has been demonstrated that a critical molecular weight is required for the attainment of good ductility and fracture toughness. This critical molecular weight is increased by the presence of short and long chain branches. The J-integral fracture toughness increases by a factor of 2.5 over the molecular weight range (M = 40,000 - 100,000) where tensile ductility is achieved. Those polymers with high strain hardening rates resist deformation due to stress concentration at crack tips and thus display increased fracture toughness.

513,630
PB85-854388/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Plastics and Elastomers: Electrical Conductivity. 1973-June 1983 (Citations from the Rubber and Plastics Research Association Data Base).
Rept. for 1973-Jun 83.
Jan 85, 220p

This bibliography contains citations concerning research and development, properties, and performance evaluations of the electrical conductivity of thermoplastics, thermosets, and elastomers. Among the topics included are conductivity in filled and unfilled plastics and elastomers, curing by means of conductive fillers, and better plating properties for conductive plastics. Applications for electrically conductive plastics and elastomers are included. (This updated bibliography contains 224 citations, none of which are new entries to the previous edition.)

513,631
PB85-854396/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Plastics and Elastomers: Electrical Conductivity. July 1983-January 1985 (Citations from the Rubber and Plastics Research Association Data Base).
Rept. for Jul 83-Jan 85.
Jan 85, 130p
Supersedes PB83-866012.

This bibliography contains citations concerning research and development, properties, and performance evaluations of the electrical conductivity of thermoplastics, thermosets, and elastomers. Among the topics included are conductivity in filled and unfilled plastics and elastomers, curing by means of conductive fillers, and better plating properties for conductive plastics. Applications for electrically conductive plastics and elastomers are included. (This updated bibliography contains 161 citations, all of which are new entries to the previous edition.)

513,632
PB85-854453/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Prepregs. 1970-January 1985 (Citations from the U. S. Patent Data Base).
Rept. for 1970-Jan 85.
Jan 85, 64p

This bibliography contains citations of selected patents concerning fabrication techniques and applications of prepreg materials. Flame retardant, electrically conductive, and electrically insulating prepregs are among the specific types discussed. Applications include utilization in artificial limbs, circuit boards, and sporting equipment. A variety of resin compositions, and curing methods used in fabrication processes are presented. (Contains 79 citations fully indexed and including a title list.)

11J. Rubbers

513,633
PB85-140937 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Internal Volumetric Setting Expansion of Casting Investments.
Final rept.,
F. A. Marsaw, W. G. de Rijk, R. Hesby, R. W. Hinman, and G. Pelleu. Sep 84, 6p
Sponsored by American Dental Association Health Foundation, Chicago, IL.
Pub. in Jnl. of Prosthetic Dentistry 52, n3 p361-366 Sep 84.

Previous studies of setting expansion employed external measurements on a core of investment material; no determinations have been attempted in the center of the mold where the wax pattern is located. The purpose of this study was to develop a technique for evaluating setting expansion in the pattern area of an investment mold. The setting expansion of three commercially available phosphate-bonded investments was determined by measuring the change in volume of a cavity located in the center of the investment. A water-filled reservoir with a volume of 1.2 ml was connected to a 0.1 ml pipette (0.3 mm in diameter) and

embedded in the center of the casting investment. Changes in the volume of the reservoir resulted in changes in the water level in the pipette. The internal temperature of the investment was monitored by a thermocouple. This experiment was performed with both nonyielding metal and yielding rubber casting rings. The results for the metal and rubber casting rings were indistinguishable. These findings indicate a need to re-evaluate the methods by which setting expansion is measured as well as the mechanism by which this expansion takes place.

513,634

PB85-854263/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Polyurethane Resins: Synthesis and Properties. 1979-1984 (Citations from the NTIS Data Base).
Rept. for 1979-1984.
Jan 85, 224p
Supersedes PB83-806406.

This bibliography contains citations concerning the synthesis, polymerization, casting, and physical and chemical properties of urethane resins. These resins are used in such applications as adhesives, solid propellants, coatings, biomaterials, structural members, and sealers. Excluded are studies on urethane foams. (This updated bibliography contains 246 citations, 102 of which are new entries to the previous edition.)

11L. Wood and Paper Products

513,635

AD-A148 645/5/GAR PC **A03/MF A01**
Forest Products Lab., Madison, WI.
Influence of Moisture Content on the Flexural Properties of Southern Pine Dimension Lumber.
Forest Service research paper,
T. E. McLain, A. L. DeBonis, D. W. Green, F. J. Wilson, and C. L. Link. Oct 84, 44p Rept no. FSRP-FPL-447

Based on the study results we conclude that: (1) In general, drying increases the flexural properties of Southern Pine dimension lumber. (2) Improvements in Moduli of Rupture (MOR) and Moduli of Elasticity (MOE) with drying are significant for Select Structural lumber at virtually all levels of the cumulative frequency distribution. The magnitude of the increase for mean MOE and fifth percentile MOR for Select Structural lumber appears to exceed that assumed in ASTM standard D245-81 for lumber dried to an equilibrium Moisture Content (MC) of 15%. (3) The degree of improvement in strength as lumber dries decreases as lumber quality decreases and width increases. For lower grades and wider widths, the 25% increase in fifth percentile MOR assumed in D245-81 appears excessive. (4) The effect of MC on MOE is relatively independent of lumber size and quality. (5) Drying lumber to an average MC less than 15% cannot usually be justified on the basis of improvements in flexural strength and stiffness.

513,636

AD-A148 826/1/GAR PC **A02/MF A01**
Forest Products Lab., Madison, WI.
Marine Exposure of Preservative-Treated Small Wood Panels.
Forest Service research note,
B. R. Johnson, and D. I. Gutzmer. Oct 84, 23p Rept no. FSRN-FPL-0248

Small wood panels treated with many different chemicals have been exposed to limnorian and teredine marine borers in the sea at Key West, Florida. These preservatives and treatments include creosotes with and without modification, waterborne salts, salt-creosote dual treatments, chemical modifications of wood, and modified polymers. In spite of the accelerated nature of this test, many treated panels remain free of attack after 13-1/2 years in the sea. Untreated panels have been badly damaged by marine borers in 6 to 18 months. Borer activity has lessened in recent years. Keywords: Wood preservation, marine borers, creosote, Limnoria, teredines, CCA, durability.

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

513,637

AD-A148 591/1/GAR PC **A02/MF A01**
University of Southern California, Los Angeles. Dept. of Electrical Engineering.
L-Infinity-Optimal Sensitivity versus Stability Margin,
M. G. Safonov. 16 Dec 83, 5p AFOSR-TR-84-0810
Grants AFOSR-80-0013, NSF-INT83-02754
Pub. in Proceedings IEEE Conference on Decision and Control, 4p 14-16 Dec 83.

No abstract available.

513,638

AD-A148 620/8/GAR PC **A02/MF A01**
State Univ. of New York at Stony Brook. Dept. of Applied Mathematics and Statistics.
Modules of Continuum Structures. Revised.
Technical rept.,
L. A. Baxter, and C. Kim. Jun 84, 23p AFOSR-TR-84-1063
Grants AFOSR-84-0243, NSF-ECS83-06871

This document presents a continuum structure functions which are nondecreasing mapping from the unit hypercube to the unit interval. The main results of Birnbaum and Esary's theory of modules of binary structure functions, in particular the Three Modules Theorem, are described.

513,639

AD-A148 621/6/GAR PC **A02/MF A01**
State Univ. of New York at Stony Brook. Dept. of Applied Mathematics and Statistics.
Bounding the Stochastic Performance of Continuum Structure Functions I.
Technical rept.,
L. A. Baxter, and C. Kim. Oct 84, 18p AFOSR-TR-84-1084
Grants AFOSR-84-0243, NSF-ECS83-06871

A continuum structure function gamma is a nondecreasing mapping from the unit hypercube to the unit interval. Minimal path (cut) sets of upper (lower) simple continuum structure functions are introduced and are used to determine bounds on the distribution of gamma (X) when X is a vector of associated random variables and when is right (left)-continuous. It is shown that, if gamma admits of a modular decomposition, improved bounds may be obtained. (Author)

513,640

AD-A148 622/4/GAR PC **A04/MF A01**
North Carolina Univ. at Chapel Hill. Dept. of Statistics.
Research in Stochastic Processes.
Interim scientific rept. 1 Nov 83-31 Aug 84,
S. Cambanis, R. J. Carroll, G. Kallianpur, and M. R. Leadbetter. Oct 84, 63p AFOSR-TR-84-1080
Contract F49620-82-C-0009

Document describes research conducted in the area of stochastic processes and in statistical estimation and inference.

513,641

AD-A148 677/8/GAR PC **A02/MF A01**
Stanford Univ., CA. Lab. for Computational Statistics.
Computing Environments for Data Analysis. Part 1. Introduction.
Technical rept.,
J. A. McDonald, and J. Pedersen. Apr 84, 23p Rept no. LCS-TR-9
Contracts N00014-83-K-0472, DAAG29-82-K-0056
See also Part 2, AD-A148 678.Sponsored in part by Grant N00014-83-G-0121.

Statistics has long been thought of as applied mathematics. Certain parts of it, especially data analysis, could easily be viewed as applied computation. In this context, different research issues assume importance, in particular, the design and implementation of computing environments for data analysis. Analyzing data requires computing, whether with paper-and-pencil or with a Cray super computer. The computing environment determines what sorts of statistical methods are practical. More importantly, the statistician's unconscious assumptions, or mental model of the computing environment determines the kinds of new statistical methods that are likely to be invented. Most current research in statistical computing is based on a batch processing model of computing environments that was appropriate twenty years ago. With a few exceptions, statisticians have not addressed the implications current and future developments in scientific computing environments. This paper is the first in a series that discuss local networks of graphics workstations as environments for statistical computing. In this, first part, we provide general background and motivation.

513,642

AD-A148 678/6/GAR PC **A02/MF A01**
Stanford Univ., CA. Lab. for Computational Statistics.
Computing Environments for Data Analysis. Part 2. Hardware.
Technical rept.,
J. A. McDonald, and J. Pedersen. Apr 84, 24p Rept no. LCS-TR-10
Contracts N00014-83-K-0472, DAAG29-82-K-0056
See also Part 1, AD-A148 677.Sponsored in part by Grant N00014-83-G-0121.

This paper is one of a series on aspects of modern computing environments that are relevant to statistical data analysis. We argue that a network of graphics workstations is a far superior to conventional batch or time-sharing computers as an environment for interactive data analysis. Originator-supplied keywords include: Interactive graphics, and programming environments.

513,643

AD-A148 711/5/GAR PC **A02/MF A01**
Clarkson Univ., Potsdam, NY. Inst. for Nonlinear Studies.
Multidimensional Inverse Scattering for First Order Systems.
Technical rept.,
A. I. Nachman, and M. J. Ablowitz. Jul 84, 16p
AFOSR-TR-84-0918
Grant AFOSR-78-3674

A method for solving the inverse problem for a class of multidimensional first order systems is given. The analysis yields equations which the scattering data must satisfy; these equations are natural candidates for characterizing admissible scattering data. The results are used to solve the multidimensional N-wave resonant interaction equations. (Author)

513,644

AD-A148 724/8 Not available NTIS
Springer-Verlag, New York.
Proceedings of Time Series Analysis of Irregularly Observed Data Held at College Station, Texas on February 10-13, 1983,
E. Parzen. 1983, 372p
Availability: Springer-Verlag, 23 Fifth Ave., New York, NY 10010 HC $21.00 (No copies furnished by DTIC/NTIS).

The analysis of irregularly observed time series (or time series with missing data) is one of the most important problems faced by applied researchers whose data arise in the form of time series (or processes). The papers in this Proceedings provide a comprehensive review of the approaches that time series analysts are taking to infer the properties of a complete time series from irregularly observed values. These papers provide introductions to the diversity of modern approaches to the analysis and modeling of time series as well as the extension of these methods to missing data or irregularly observed values.

513,645

AD-A148 751/1/GAR PC **A02/MF A01**
South Carolina Univ., Columbia. Dept. of Mathematics and Statistics.

Exact Simultaneous Confidence Intervals for Pairwise Comparisons of Three Normal Means.
Technical rept.,
J. D. Spurrier, and S. P. Isham. Oct 84, 21p AFOSR-TR-84-1154
Grant AFOSR-84-0156

The problem of simultaneously estimating the pairwise differences of means of three independent normal populations with equal variances is considered. A computational method involving a bivariate t density is used to form confidence intervals with simultaneous coverage probability equal to 1 - alpha. For equal sample sizes, the method is the Tukey studentized range procedure. With unequal sample sizes, the method is superior to the various generalized Tukey methods. A table of probability points is presented for small sample sizes. A large sample approximation based on the bivariate normal and the studentized range distributions is given.

513,646
AD-A148 752/9/GAR PC A03/MF A01
South Carolina Univ., Columbia. Dept. of Mathematics and Statistics.
Small-Sample Properties of Kernel Density Estimators from Randomly Right-Censored Data.
Technical rept.,
W. J. Padgett, and D. T. McNichols. Oct 84, 34p TR-102, 62G05-11, AFOSR-TR-84-1153
Grant AFOSR-84-0156

The small-sample behavior of two kernel-type density estimators which have been proposed in the literature for randomly right-censored samples is investigated via Monte Carlo simulations. The extensive simulation study was performed for five families of life distributions, two different censoring distributions, three kernel functions, and several bandwidth sequences and for sample sizes from n=20 to n=300. The simulation results reinforce previous theoretical results for the estimators and lead to conjectures about their general behavior asymptotically as well as for small samples. A comparison of the two density estimators is also indicated.

513,647
AD-A148 753/7/GAR PC A02/MF A01
South Carolina Univ., Columbia. Dept. of Mathematics and Statistics.
Kernel Type Estimator of a Quantile Function from Right-Censored Data.
Technical rept.,
W. J. Padgett. Nov 84, 25p TR-101, 62G05-10, AFOSR-TR-84-1150
Grant AFOSR-84-0156

Arbitrarily right-censored data arise naturally in industrial life testing and medical follow-up studies. In these situations it is important to be able to obtain nonparametric estimates of various characteristics of the survival function S. Based on such right-censored data, Kaplan and Meier gave the nonparametric maximum likelihood estimator of S, called the product-limit estimator, and , among others, Reid has proposed methods of estimating the median survival time from the product-limit estimator. Recently, Nair studied the problem of confidence bands for the survival function obtained from the product-limit estimator. Also, Padgett and McNichols and McNichols and Padgett have discussed estimation of a density for the survival distribution based on right-censored data. One characteristic of the survival distribution that is of interest is the quantile function, which is useful in reliability and medical studies. The quantile function of the product-limit estimator is a step function with jumps corresponding to the uncensored observations. The purpose of this paper is to present a smoothed nonparametric estimator of the quantile function from arbitrarily right-censored data based on the kernel method. It will be shown that under general conditions this estimator, mentioned briefly by Parzen is strongly consistent, and based on the results of a small Monte-Carol simulation study, performs better than quantile function of the product-limit estimator in the sense of smaller mean squared error. In particular, better estimates of the median survival time are obtainable. In addition, an approximation to the kernel estimator will be shown to be almost surely asymptotically equivalent to it under certain conditions.

513,648
AD-A148 754/5/GAR PC A02/MF A01
South Carolina Univ., Columbia. Dept. of Mathematics and Statistics.

Nonparametric Maximum Penalized Likelihood Estimation of a Density from Arbitrarily Right-Censored Observations.
Technical rept.,
A. M. Lubecke, and W. J. Padgett. Oct 84, 18p TR-96R, 62G05-9-REV, AFOSR-TR-84-1149
Grant AFOSR-84-0156

Based on arbitrarily right-censored observations from a probability density function f deg the existence and uniqueness of the maximum penalized likelihood estimator (MPLE) of f deg is proven. In particular, the first MPLE of Good and Gaskins of a density defined on (0, infinity) is shown to exist and to be unique under arbitrary right-censorship. Furthermore, the MPLE is in the form of a solution to a linear integral equation. (Author).

513,649
AD-A148 759/4/GAR PC A02/MF A01
Columbia Univ., New York. Dept. of Applied Physics and Nuclear Engineering.
Investigation of Three-Dimensional Mesh Generation with Precise Controls.
Interim scientific rept. 31 Oct 83-30 Sep 84,
P. R. Eiseman. Oct 84, 8p AFOSR-TR-84-1146
Grant AFOSR-82-0176

During this period, the development of algebraic and adaptive grid techniques were continued and brought into a more refined state. Included were the topics of multisurface transformations together with Boolean operations, pointwise distributions on curves, two-dimensional surface grids embedded in three-dimensions, three-dimensional volume grids and the adaptive strategies of mean value relaxation, alternating direction, and center of mass relaxation for triangular meshes. Of paramount importance in the various adaptive strategies was the utilization of weighting functions, which was studied and still requires further development. (Author)

513,650
AD-A148 833/7/GAR PC A06/MF A01
Stanford Univ., CA. Lab. for Computational Statistics.
Principal Curves and Surfaces.
Technical rept.,
T. Hastie. Nov 84, 107p Rept no. LCS-TR-11
Contracts N00014-83-K-0472, N00014-81-K-0340
Sponsored in part by Contracts DE-AC03-76SF00515, DE-AT03-81-ER10843, and DAAG29-82-K-0056.

Principal curves are smooth one dimensional curves that pass through the middle of a p dimensional data set. They minimize the distance from the points, and provide a non-linear summary of the data. The curves are non-parametric and their shape is suggested by the data. Similarly, principal surfaces are two dimensional surfaces that pass through the middle of the data. The curves and surfaces are found using an iterative procedure which starts with a liner summary such as the usual principal component line or plate. Each successive iteration is a smooth or local average of the p dimensional points, where local is based on the projections of the points onto the curve or surface of the previous iteration. A number of linear techniques, such as factor analysis and errors in variables regression, end up using the principal components as their estimates (after a suitable scaling of the co-ordinates). Principal curves and surfaces can be viewed as the estimates of non-linear generalizations of these procedures. Principal Curves (or surfaces) have a theoretical definition for distributions: they are the Self Consistent curves. A curve is self consistent if each point on the curve is the conditional mean of the points that project there. The main theorem proves that principal curves are critical values of the expected squared distance between the points and the curve. Linear principal components have this property as well; in fact, we prove that if a principal curve is straight, then it is a principal component. These results generalize the usual duality between conditional expectation and distance minimization. We also examine two sources of bias in the procedures, which have the satisfactory property of partially cancelling each other.

513,651
AD-A148 834/5/GAR PC A02/MF A01
University of Southern California, Los Angeles. Dept. of Electrical Engineering.

Input-Output Stability Analysis with Magnetic Hysteresis Non-Linearity,
M. G. Safonov, and K. Karimlou. Dec 83, 5p AFOSR-TR-84-1121
Grants AFOSR-80-0013, NSF-INT83-02754
Proceedings of the IEEE Conference on Decision and Control (22nd), San Antonio, TX, 14-16 Dec 83.

In this document Popov type frequency domain conditions for stability of feedback systems containing ferromagnetic hysteresis nonlinearity are established. (Author).

513,652
DE85000177/GAR PC A07/MF A01
Princeton Univ., NJ. Dept. of Statistics.
Checking the Shape of Discrete Distributions.
D. C. Hoaglin, and J. W. Tukey. Aug 84, 140p DOE/ER/10841-11
Contract AC02-81ER10841
Technical Report No. 275, Series 2.
Portions are illegible in microfiche products.

Techniques for examining or testing the distributional behavior of a sample of continuous data have received much attention in the statistical literature. Most commonly the question is whether the data depart seriously from a Gaussian distribution, either systematically or by having a few anomalous observations. At times other families of distributions, such as the exponential or the Weibull, serve as the standard of comparison. Rather than summarize a possibly complex pattern of behavior in a single number, we learn more from graphical displays, as in a normal probability plot. In a similar vein graphical techniques help us to appreciate how closely a sample of discrete data follows a member of one of the common families of discrete distributions, such as the binomial or the Poisson. Simple graphical techniques that incorporate resistance - so as to isolate unusual portions of the data and prevent them from distorting the overall picture are emphasized here. (ERA citation 10:004127)

513,653
DE85000230/GAR PC A02/MF A01
Cornell Univ., Ithaca, NY. Dept. of Mathematics.
Preconditioned Iterative Methods for Nonselfadjoint or Indefinite Elliptic Boundary Value Problems.
J. H. Bramble, and J. E. Pasciak. 1984, 18p BNL-35211, CONF-8405249-1
Contract AC02-76CH00016
International symposium on the unification of finite element, finite difference and the calculus of variations, Storrs, CT, USA, 4 May 1984.

We consider a Galerkin-Finite Element approximation to a general linear elliptic boundary value problem which may be nonselfadjoint or indefinite. We show how to precondition the equations so that the resulting systems of linear algebraic equations lead to iteration procedures whose iterative convergence rates are independent of the number of unknowns in the solution. (ERA citation 10:004123)

513,654
DE85000745/GAR PC A02/MF A01
Lawrence Livermore National Lab., CA.
Solving Partial Differential Equations on Multiprocessors.
G. Rodrigue. Sep 84, 18p UCRL-91570, CONF-841242-1
Contract W-7405-ENG-48
International workshop on modelling and performance evaluation of parallel systems, Grenoble, France, 14 Dec 1984.
Portions are illegible in microfiche products.

Multiprocessors can be characterized by two attributes: first, a multiprocessor is a single computer that includes multiple processors and, second, processors may communicate and cooperate at different levels in solving a given problem. The communication may occur by sending messages from one processor to the other or by sharing a common memory. In this paper, we will not be concerned with multiple computer systems that consist of several autonomous computer systems which may or may not communicate with each other. Instead, our primary focus will be on a multiprocessing system which is controlled by one operating system that provides interaction between computer modules (a computer module is defined as a processor, local memory, and I/O interfaces). 17 references, 10 figures. (ERA citation 10:001702)

513,655
DE85002041/GAR PC A02/MF A01
Los Alamos National Lab., NM.
Using Semigroups and the Trotter Product Formula to Solve Quasi-Linear Systems.
G. H. Pimbley. 1984, 22p LA-UR-84-2937, CONF-8407103-1
Contract W-7405-ENG-36
American Mathematical Society/SIAM meeting, Santa Fe, NM, USA, 23 Jul 1984.

A quasi-linear system with linear coupling terms is treated. An approximate system for which the Trotter product of constituent semigroups converges is solved. Then it is shown that the approximate solutions converge to a solution of the original system, and that the resulting solution operator is a semigroup. Remarks are made about a nonlinearly coupled system. 12 references. (ERA citation 10:003908)

513,656
DE85002204/GAR PC A02/MF A01
Los Alamos National Lab., NM.
Eliciting and Aggregating Subjective Judgements: Same Experimental Results.
H. F. Martz, M. C. Bryson, and R. A. Waller. 1984, 21p LA-UR-84-3193, CONF-841077-1
Contract W-7405-ENG-36
Statistics symposium on national energy issues, Seattle, WA, USA, 16 Oct 1984.
Portions are illegible in microfiche products.

An introductory review of the literature on eliciting and aggregating subjective judgements is provided. Six direct numerical methods for eliciting subjective probabilities over continuous variables are compared using four types of stimuli. The comparison is based on an experiment conducted at Los Alamos. Six mathematical aggregation rules for providing consensus point and confidence interval judgements are also compared. Some simple conclusions are stated. (ERA citation 10:003889)

513,657
DE85002368/GAR PC A06/MF A01
Michigan State Univ., East Lansing. Dept. of Electrical Engineering and Systems Science.
Reduced-Order Modeling, Stochastic Singular Perturbation and Sampled-Data Control.
H. Khalil, M. El-Ansary, Z. Gajic, and B. Litkouhi. Sep 81, 103p DOE/RA/50425-T2, MSU/ENGR-81/009
Contract AC01-80RA50425
Portions are illegible in microfiche products.

In the first year of the project three problems have been considered: reduced-order modeling of nonlinear singularly perturbed systems driven by wide-band noise; estimation and control of stochastic linear singularly perturbed systems, and sampled-data control of linear time-invariant singularly perturbed systems. The first problem extends the use of singular perturbation theory, as an order-reduction tool, to stochastic nonlinear systems driven by wide-band noise. Multirate sampled-data control will be used, eventually, to implement multimodel strategies of systems with slow and fast modes as periodic coordination strategies. (ERA citation 10:004128)

513,658
DE85002801/GAR PC A03/MF A01
Lawrence Livermore National Lab., CA.
Three Algorithms for Parametric Frequency Domain System Identification.
D. M. Tilly. Nov 84, 35p UCID-20255
Contract W-7405-ENG-48
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

System identification is used in many engineering applications. Most of these identification problems can be solved using one of the many time domain methods that have been studied and well developed in the last 15 years. However, in practice frequency response data, or Bode plots, may be the only data available to the engineer. Also, in some applications a time domain model of the system is not necessary. Instead, the engineer wishes to gain a general knowledge of system response. In these instances a frequency domain system identification technique may be more appropriate. For this particular project there was an interest in estimating the coefficients of a Laplace transform transfer function system model. The transfer function model would aid in the design of machine tool control systems. Several available parametric frequency domain identification methods were studied and three computer codes were chosen for further development as representatives of different approaches to the solution of the problem. (ERA citation 10:004141)

513,659
DE85003170/GAR PC A02/MF A01
Brookhaven National Lab., Upton, NY.
Chaos in Dynamical Systems: A Selected Bibliography.
H. B. Stewart. Oct 84, 25p BNL-35390
Contract AC02-76CH00016

No abstract available.

513,660
DE85900141/GAR PC A03/MF A01
Institute of Nuclear Energy Research, Lung-Tan (Taiwan). Technical Information Center.
Coefficients Determination of Differential State Equations from Laplace Transfer Function.
C. Y. Wang. Apr 83, 28p INER-0503
In Chinese.
U.S. Sales Only. Portions are illegible in microfiche products.

In control theory, the characteristics of a system are generally described or defined by Laplace transfer function. However, the state variable differential equations are generally used in the actual system simulation on hybrid computer or general digital computer. In this way, the differential equations are integrated to get the result. So, the first thing in system simulation is to transiate the Laplace transfer function into the state variable differential equations. The primary object of this article is to develop a computer program to do this job as well as scale the coefficient of each state variable through interactive communication with computer on a terminal. (ERA citation 09:051052)

513,661
DE85900149/GAR PC A03/MF A01
Institute of Nuclear Energy Research, Lung-Tan (Taiwan).
Solving of Inverse Z-Transfer Function by Recurrent Permutation Method.
C. Y. Wang. Jul 83, 34p INER-0514
U.S. Sales Only.

In general, a lot of matrix manipulations are needed to find an inverse Z-transfer function. Basically, a total of KTxNxN times of multiplications, exclusive of additions, are required for a N-order inverse Z-transfer function to get results for KT discrete points. In this article, an efficient method which, taking good advantage of the characteristics of the matrix formed with the transfer function coefficients, can reduce multiplications and additions to only 2xKTxN times for the same amount of results is proposed. This approach is called Recurrent Permutation Method. It can save a lot of computer time by significantly reducing the multiplications needed. As multiplications in the linear domain are equivalent to additions in the logarithmic domain, the algorithms developed in both domains are included in a computer program. The choice based on the characteristics of the desired applications is left to the user. (ERA citation 09:050978)

513,662
N85-12564/9/GAR PC A02/MF A01
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Chandrasekhar Equations and Computational Algorithms for Distributed Parameter Systems.
J. A. Burns, K. Ito, and R. K. Powers. Sep 84, 25p NAS 1.26:172467, ICASE-84-50, NASA-CR-172467
Contracts NAS1-17070, NAS1-17130

The Chandrasekhar equations arising in optimal control problems for linear distributed parameter systems are considered. The equations are derived via approximation theory. This approach is used to obtain existence, uniqueness, and strong differentiability of the solutions and provides the basis for a convergent computation scheme for approximating feedback gain operators. A numerical example is presented to illustrate these ideas.

513,663
N85-12616/7/GAR PC A02/MF A01
Oxford Univ. (England).
Relationship Between Lehtomaki's Robustness Test and an Inverse Nyquist Based Test.
I. Postlethwaite, M. S. Tombs, Y. K. Foo, and A. P. Loh. 1984, 12p OUEL-1526/84
Sponsored by United Kingdom Science and Engineering Research Council and Rae.

The Lehtomaki robustness test and the inverse Nyquist based test of Postlethwaite and Foo are compared. Although the inequality in each test is the same, the conditions under which each is applicable are different. The inverse Nyquist based test can be used, providing the plant and perturbed plant models share the same number of closed right-half plane (CRHP) zero. It is shown that Lehtomaki's conditions are satisfied if the plant and perturbed plant models have the same numbers of poles and zeros in the CRHP. Lehtomaki's test is therefore a special case of the inverse Nyquist based test.

513,664
N85-12617/5/GAR PC A03/MF A01
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Pseudospectral Legendre Method for Hyperbolic Equations with an Improved Stability Condition.
H. Tal-ezer. Sep 84, 48p NAS 1.26:172475, ICASE-84-48, NASA-CR-172475
Contract NAS1-17070

A new pseudospectral method is introduced for solving hyperbolic partial differential equations. This method uses different grid points than previously used pseudospectral methods: in fact the grid are related to the zeroes of the Legendre polynomials. The main advantage of this method is that the allowable time step is proportional to the inverse of the number of grid points 1/N rather than to 1/n(2) (as in the case of other pseudospectral methods applied to mixed initial boundary value problems). A highly accurate time discretization suitable for these spectral methods is discussed.

513,665
N85-12641/5/GAR PC A02/MF A01
Technische Hochschule, Darmstadt (Germany, F.R.).
Weber Explizite Differenzenverfahren fuer Hyperbolisch Systeme Mit Variablen Koeffizienten 2 (On Explicit Difference Schemes for Hyperbolic Systems with Variable Coefficient 2).
K. G. F. Vonfinckenstein. Mar 84, 13p PREPRINT-808
Text in German. Submitted for Publication.

The introduction of a modified stability condition is used to show that the Lax-Wendroff method converges for irregular hyperbolic systems with variable coefficients. The proof does not use local amplification matrices. The stability is directly proved by estimation of the powers of the discretized matrices.

513,666
PB85-110708/GAR PC E08/MF E08
University of Manchester Inst. of Science and Technology (England). Control Systems Centre.
Self-Tuning Algorithm for Multivariable Systems,
J. Raisch. Sep 83, 141p CONTROL SYSTEMS CENTRE-582

The main aim of this project is to develop a multivariable pole assignment self-tuning algorithm that incorporates a compensator of least degree. For this purpose, CARMA-model and transfer function matrix (as common system descriptions in identification and linear systems theory) have to be combined. This will be done in Chapter 3. Chapter 1 will be used to show that self-tuning is a very special form of adaptive control and to explain in what respect it is different from other adaptive control schemes. In Chapter 2 the discrete-time system model used in the subsequent parts of this report will be introduced and related to the underlying continuous-time process to be controlled. It also includes a brief review of existing multivariable self-tuning algorithms. Finally, in Chapters 4 and 5, we will present two examples and discuss the results.

513,667
PB85-138394/GAR PC E03/MF E03
National Physical Lab., Teddington (England).
Error and Uncertainty,
P. J. Campion. c1984, 7p NPL-DPMA-2

Outside metrological circles (and sometimes, even within them) there is often confusion between the

meanings of the words 'error' and 'uncertainty'. On occasions they appear to be used synonomously, but for metrological purposes it is useful if they are given distinct meanings. This is discussed by the author in this brief paper. The author notes that the word 'uncertainty' has become widely accepted as a general descriptor for the value after the plus or minus sign.

513,668
PB85-139046/GAR PC E04/MF E04
Oxford Univ. (England). Dept. of Engineering Science.
Self-Tuning Control of Offset: A Unified Approach,
P. S. Tuffs, and D. W. Clarke. 1983, 50p OUEL-1539/84

The CARMA model generally assumed in self-tuning control frequently leads to an offset between measurement and desired value when regulating a plant subjected to constant load-disturbances about a nonzero set-point. The normal ad-hoc insertion of an integrator solves the problem but can introduce others (such as convergence difficulties). The solution explored in this paper is to use a CARIMA plant model in which the noise term is non-stationary, and it is shown that good adaptive behavior is then possible both with generalized minimum-variance and pole-placement self-tuning controllers. The approach produces integral control terms in a natural way, and for simplified plant models leads directly to a general PID algorithm.

513,669
PB85-139053/GAR PC E05/MF E05
Oxford Univ. (England). Dept. of Engineering Science.
Generalised LQG Approach to Self-Tuning Control. Part 1. Aspects of Design. Part 2. Implementation and Simulation,
D. W. Clarke, P. P. Kanjilal, and C. Mohtadi. 1984, 68p OUEL-1536/84

Implicit self-tuners based on single-stage cost-function minimization schemes require the exact knowledge of the dead-time of the controlled plant. Explicit pole-placement self-tuners on the other hand, though robust against variations of the time-delay, are very sensitive to the assumptions made about the model order of the plant; wrong assumptions may result in very poor performance. An explicit method based on minimization of a multistage cost-function and a CARIMA plant model formulated in state-space is presented. The method extends the design features of the Generalized Minimum Variance scheme to the multistage case; these can be used to tailor the closed-loop response of the system. The approach is shown to be robust against wrong a priori assumptions made about the plant dead-time or order, thus maintaining good servo and disturbance rejection properties (Part 2). Implementation aspects of the LQ self-tuner proposed in Part 1 are discussed in Part 2. The algorithmic stability and numerical robustness without sacrificing implementational simplicity makes the proposed LQ self-tuner attractive.

513,670
PB85-139384/GAR PC E03/MF E03
Cambridge Univ. (England). Dept. of Engineering.
Implementation of QR Factorization on the DAP Using Householder Transformations,
J. J. Modi, and G. S. J. Bowgen. 1984, 13p CUED/F-CAMS/TR-241
Prepared in cooperation with Queen Mary Coll., London (England).

For QR factorization of an mxn matrix with m > n using multiprocessor systems, emphasis has hitherto been on parallel application of Givens rotations, which are indeed well suited to the DAP; however, Householder transformations turn out to be faster, especially when m much > n.

513,671
PB85-139574/GAR PC E04/MF E04
Oxford Univ. (England). Dept. of Engineering Science.
Long-Range Predictive Control Using Weighting-Sequence Models,
D. W. Clarke, and L. Zang. 1984, 30p OUEL-1542/84

For a process control algorithm to be superior to PID, it must be easy to use, make only justifiable assumptions about the process dynamics, and be insensitive to dead-time and to nonminimum-phasedness. Taking an impulse-response plant representation leads to quite simple control designs which can be readily extended to be self-tuning. In this paper, three methods (PCA, DMC and IDCOM) are developed and compared in a unified manner, and it is shown that they are capable of providing good stable control under certain conditions. IDCOM, however is seen by simulations to be the least satisfactory approach. The derivations show that all of the methods are capable of further refinement; in particular DMC (potentially the most robust) benefits from using a proper predictor and cost-function rather than the heuristic 'tricks' of the original approach. The paper discusses the applicability of the algorithms and the restrictions imposed by the simple assumed plant model.

513,672
PB85-139699/GAR PC E04/MF E04
Oxford Univ. (England). Dept. of Engineering Science.
Bibliography of Adaptive Control,
D. W. Clarke. 1984, 40p OUEL-1544/84

No abstract available.

513,673
PB85-139707/GAR PC E03/MF E03
Oxford Univ. (England). Dept. of Engineering Science.
Optimal Stochastic LQ Control with Measurements Displaced in Time,
R. Gessing, and O. Jacobs. 1984, 15p OUEL-1547/84
Prepared in cooperation with Politechnika Slaska, Gliwice (Poland).

Linear stochastic systems are discussed which have non-standard information in the form of time-shifted measurements. The systems are subject to disturbances in the form of Markov processes. Measurements both of states and of disturbances are included; either may be delayed in time, and measurements of disturbances could be advanced in time. Measurement delays may be uniform over a whole vector or may vary from one element to another. State augmentation is used to give classical representations such that optimal control is determined by the certainty equivalence principle. Appropriate augmented state vectors and matrices are stated for several cases.

513,674
PB85-139715/GAR PC E03/MF E03
Oxford Univ. (England). Dept. of Engineering Science.
H(Sup Infinity Symbol) -Minimax Approach to the Design of Robust Control Systems,
Y. K. Foo, and I. Postlethwaite. Jul 84, 21p OUEL-1537/84

A realistic feedback design problem is posed based on the minimization of a weighted combination of the sensitivity and complementary sensitivity matrices. A solution is obtained which makes use of the recently proposed methods for minimizing the sensitivity function alone.

513,675
PB85-139723/GAR PC E03/MF E03
Centre d'Etude de l'Energie Nucleaire, Mol (Belgium).
Sample Size Required to be Sure That an Increase of Percent Defectives by a Factor F Will Be Labelled 'Significant' in 90% of the Cases,
J. L. van der Parren. Jun 84, 24p BLG-565
Summaries in French and Dutch. Errata sheet inserted.

A large reference sample of standardly produced items is available. A new production system is suspected of increasing the proportion of defectives. How much new material do we need to assess an increase by a factor F of the latter with confidence (1 -alpha) and power (1 -beta). Comparisons are done using hypergeometric distribution. Tables are given for F = 2 to 12, alpha= .05, beta = .10 and proportions in the reference sample P = .001, .005, .010, .015, .020.

513,676
PB85-140549/GAR PC E04/MF E04
Oxford Univ. (England). Dept. of Engineering Science.
Self-Tuning Controller Design and Implementation,
D. W. Clarke. Jan 84, 32p OUEL-1535/84

The report is organized as follows. The discretization of the continuous-time plant is briefly described, particularly with respect to the locations of the discrete-time zeros of the transfer-function and to possible models of typical load-disturbances. The general theory of predictive control is then shown to have interpretations as Smith predictive, 'detunable' model-reference and generalized minimum-variance laws. Extensions to include feedforward compensation for known disturbances are provided. The pole-placement method is derived to cover both the servo and the regulator problem, and in the latter case it is shown that a simple estimation algorithm (RLS) is sufficient. General recursive estimation methods based on minimizing the prediction error are then discussed with particular emphasis on numerically stable versions of the Recursive Least Squares (RLS) method. A simple self-tuner is then provided as a combination of an estimator and a basic control law, and the outline of the corresponding program given. Applications of self-tuning are summarized together with a discussion of the important 'jacketing' software which is used to make the theory work reliably.

513,677
PB85-142818 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Normal Form and Representation Theory.
Final rept.,
R. Cushman, A. Deprit, and R. Mosak. 1983, 16p
See also PB82-263443.
Pub. in Jnl. of Mathematics and Physics 24, n8 p2102-2117 1983.

Representation theory of Lie algebras is called upon to develop a procedure for normalizing a dynamical system with two degrees of freedom in the neighborhood of an equilibrium when the Hamiltonian H(x,y,X,Y) in the coordinates (x,y) and their conjugate momenta (X,Y) is of the type H = ((X squared) + (Y squared))/2 + V(x,y,X,Y), the potential energy V being a sum of homogeneous polynomials in the phase variables of degree strictly greater than two. The fact that the resulting potential V' is a polynomial in the new coordinates (x',y') and the angular momentum G' = x'Y' - y'X' implies that the normalization is a rotation in the configuration space from a fixed frame to an ideal frame. The technique is intended for normalizing an Hamiltonian in equilibrium at the origin when the Lie derivative associated with the quadratic part is not semi-simple e.g. the planar Restricted Problem of Three Bodies at the equilateral equilibrium L4 when the basic frequencies are equal (Routh's singular case).

513,678
PB85-144954 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Stable Marching Scheme for an Ill-Posed Initial Value Problem.
Final rept.,
A. S. Carasso. Jun 83, 25p
Grant DAAG29-78-G-0091
Pub. in International Series of Numer. Math. 63, p11-35 Jun 83.

The author develops and analyzes a marching procedure for the numerical computation of backwards parabolic equations with variable coefficients and noisy initial data. The scheme is stable (but inconsistent) and leads to error bounds of logarithmic convexity type for t bounded away from the line t = T, where the solution is only of class (L sup 2). The scheme is a two step procedure where the solution is appropriately filtered in the frequency domain, at every alternate step. The procedure assumes a constraint on the class of solutions which is stronger than the usual (L sup 2) bound at t = T. This stronger constraint is equivalent to the usual constraint in the constant coefficient case.

513,679
PB85-147882 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Hybrid Finite Element Method for Scalar Wave Refraction into Three Dimensional Bodies.
Final rept.,
P. H. E. Meijer, and G. A. H. Cowart. 1 Oct 84, 11p
Pub. in Jnl. of Applied Physics 56, n7 p1909-1920, 1 Oct 84.

The hybrid finite element method is a combination of the finite element method in a closed domain and an analytic solution outside this domain. The analytic solution is used in the region of homogeneous dielectric constant, while the finite element method is applied to the region of heterogeneous dielectric constant. Using matching conditions, that are of the nature of a non-local boundary condition, and which were described in a previous article, equations are obtained for the scalar amplitudes of the wave function refracted into an heterogeneous object of general geometry. The problem

is described by a functional, containing integrals over the volume and surface of a sperical domain which completely encloses the scattering object. This domain is divided into a set of finite elements by connecting a network of points, called nodes, distributed on and in the spherical domain. The integrals are then approximated and the variation of the functionals results in a system of linear equations in the unknown wave functions at the nodal points of the domain. The new aspect of the method is the use of cubature formulas to reduce the surface integrals to sums. The formulation is tested by comparing results with the analytic solution of the scattering by a homogeneous sphere. The relative errors, as a function of incident wavelength, are given for various points in the scattering sphere.

12B. Operations Research

513,680

AD-A148 696/8/GAR PC A02/MF A01
Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
Colored Ticket Algorithm.
Interim rept.,
M. Fischer, N. A. Lynch, J. Burns, and A. Borodin.
Aug 83, 25p Rept no. MIT/LCS/TM-269
Contracts N00014-83-K-0125, DAAG29-84-K-0058
Sponsored in part by Grants NSF-MCS83-06854 and NSF-MCS83-02391.

Upper and lower bounds are proved for shared space requirements for solution of a problem involving resource allocation among asynchronous processes. The problem is to allocate some number k > or = 1, of resources, in an environment in which processes can fail by stopping without warning. Allocation is to be as FIFO as possible, subject to variations imposed by the possibility of failures. (Author)

513,681

DE85001212/GAR PC A02/MF A01
Lawrence Livermore National Lab., CA.
Model Validation: Purpose and Expectations.
J. B. Knox. Oct 84, 14p UCRL-91664, CONF-8410165-1
Contract W-7405-ENG-48
DOE model validation workshop, Charleston, SC, USA, 23 Oct 1984.
Portions are illegible in microfiche products.

Events of the last few years suggest that we need a new view of model validation. A view of the process is a learning process where the modelers or analysts insights lead to key improvements, where the modeler is unconstrained to experiment and evaluate the alleged improvement, where the modeler and the experimenter test models on new data sets or independent subsets. We must remember that models need to be periodically challenged in order to identify model weaknesses, and the limitations of our own understanding. 7 references, 5 figures. (ERA citation 10:004143)

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

513,682

DE84006518/GAR PC A02/MF A01
Argonne National Lab., IL.
Fluidelastic Instability in Shell and Tube Heat Exchangers - a Framework for a Prediction Method.
M. W. Wambsganss, C. I. Yang, and H. Halle. 1984, 16p CONF-841201-1
Contract W-31-109-ENG-38
ASME winter annual meeting, New Orleans, LA, USA, 9 Dec 1984.
Portions are illegible in microfiche products.

A framework for a method to predict fluidelastic instability in heat exchanger tube bundles is presented. The method relies on a computer code to obtain a simulation of the three-dimensional flow distribution within the heat exchanger. With this information, local crossflow velocities corresponding to each tube in the exchanger are obtained by interpolation and resultant crossflow velocity distributions are computed. With a knowledge of the vibration mode shapes and frequencies, reduced effective crossflow velocities are then computed for each tube. The tubes with highest values of predicted reduced effective crossflow velocity are expected to be the first to experience fluidelastic instability. Comparisons with test results and design data from ideal laboratory tests show very good qualitative as well as quantitative agreement. However, additional development and evaluation are required. 19 references. (ERA citation 10:003013)

513,683

DE84006603/GAR PC A02/MF A01
Argonne National Lab., IL.
Flow-Induced Tube Vibration Thresholds in Heat Exchangers from Shellside Water Tests.
H. Halle, J. M. Chenoweth, and M. W. Wambsganss. 1984, 15p CONF-841201-4
Contract W-31-109-ENG-38
ASME winter annual meeting, New Orleans, LA, USA, 9 Dec 1984.

Typical industrial shell-and-tube heat exchanger configurations are investigated experimentally for the occurrence of potentially damaging tube vibration as a function of flowrate. The effort is part of a program to develop vibration avoidance criteria to be integrated and optimized with the advanced thermal, hydraulic, and mechanical design methods now available. The tests use a 0.6-m (2-ft)-diameter, 3.7-m (12-ft)-long shell containing a removable tube bundle whose components are readily rearranged or replaced. The 15 different full tube bundle configurations tested represent various combinations of parameters: triangular or square tube layout patterns with different orientations to the flow, number of crosspasses, sizes of nozzles, plain or finned tubes. All bundles have 19-mm (0.75-in.)-diameter tubes spaced with a pitch-to-diameter ratio of 1.25. The heat exchanger is tested with waterflow on the shellside to determine a critical threshold, above which a small increase in the flowrate initiates a fluidelastic instability resulting in large amplitude vibration. The test conditions, the critical flowrates, the vibration frequencies, and the locations of the tubes most susceptible to vibration are presented. The given data are used for a comparison with a presently recognized method of vibration prediction and will permit updated evaluations as more advanced methods become available in the future. (ERA citation 10:003014)

513,684

DE84012637/GAR PC A03/MF A01
Los Alamos National Lab., NM.
Selection of Regenerator Geometry for Magnetic Refrigerator Applications.
J. A. Barclay, and S. Sarangi. 1984, 33p LA-UR-84-1538, CONF-841201-9
Contract W-7405-ENG-36
ASME winter annual meeting, New Orleans, LA, USA, 9 Dec 1984.
Portions are illegible in microfiche products.

In our effort to develop magnetic regenerators of high efficiency we have looked at the following geometries: (1) tube channels in solid block; (2) stack of perforated plates normal to the fluid flow direction; (3) stack of solid plates parallel to fluid flow direction, and packed bed of spherical particles; (4) loose packed; and (5) sintered. Reported are computations of the overall efficiency of the regenerator, considering heat transfer, longitudinal conduction, and fluid pressure drop, for all the above arrangements as a function of geometrical variables, such as overall length and particle diameter or plate thickness. The results yield the optimum geometry for a given combination of other controlling parameters, such as frequency, porosity, and fluid properties. The different geometries are compared under the constraint that the mass of magnetic material is the same for all. This condition is peculiar to the magnetic refrigeration process because the net refrigeration and driving forces are proportional to the mass of magnetic material. (ERA citation 10:002958)

513,685

DE85001401/GAR PC A03/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Control of Formaldehyde in Indoor Air by Air Washing.
B. S. Pedersen, and W. J. Fisk. Mar 84, 33p LBL-17381
Contract AC03-76SF00098
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Formaldehyde is an indoor air pollutant that is present in significant concentrations. One pothential energy efficient control technique is removal of airborne formaldehyde by absorption water. A mathematical model of an air washer for formaldehyde control is presented and a laboratory investigation of this technique is described. Two full-scale experimental air washers were designed, fabricated, and tested. The air washers consisted of air-solution contact arrangements through which air was forced by a fan. A small amount of the washing water was continuously replaced to prevent its saturation with formaldehyde. A refrigeration cycle was used to control the humidity of the outlet airstream. The formaldehyde removal efficiencies were affected by the water replacement rates, air flow rates, inlet airstream formaldehyde concentration, and the design of the air-solution contact arrangements. Based on experimental results and the mathematical model, the impact of these various parameters on air washer efficiency is discussed. The power consumption for an air washer with a 140 l/s flow rate is predicted to be 1500 to 1800 W. The energy consumed by the refrigeration cycle can be delivered either to the indoor space, thus reducing the heating load of the building, or rejected to outdoors, thus providing cooling indoors. Results show that an air washer which has an acceptable water requirement can effectively remove formaldehyde from indoor air. The energy requirements could be acceptable in situations where most of the energy consumed provides usable heat or cooling. 18 references, 7 figures, 3 tables. (ERA citation 10:003256)

513,686

DE85002298/GAR PC A03/MF A01
Oak Ridge National Lab., TN.

Formaldehyde Emissions from Combustion Sources and Solid Formaldehyde Resin Containing Products: Potential Impact on Indoor Formaldehyde Concentrations and Possible Corrective Measures.
T. G. Matthews, T. J. Reed, B. J. Tromberg, C. R. Daffron, and A. R. Hawthorne. 1983, 30p CONF-8310336-1
Contract AC05-84OR21400
ASHRAE conference on management of atmosphere in tightly enclosed spaces, Santa Barbara, CA, USA, 16 Oct 1983.

The formaldehyde (CH sub 2 O) emission rates of combustion sources and solid CH sub 2 O resin-containing products commonly found in domestic environments are surveyed. The potential contribution of these sources to indoor CH sub 2 O concentrations are estimated using simple steady-state, indoor pollutant concentration models. The strongest contributors to indoor CH sub 2 O are pressed-wood products and foam insulation containing urea formaldehyde resins. Combustion sources and phenon-formaldehyde resin-bonded products are generally weak emitters. Potential corrective measures to reduce indoor CH sub 2 O concentrations are reviewed. Ammonia fumigation, permeation barriers on non-decorative surfaces, and increased ventilation may be useful techniques to reduce the contribution of strong solid emission sources until the CH sub 2 O emissions are reduced to more acceptable levels through normal product aging. 38 references, 1 figure, 11 tables. (ERA citation 10:003251)

513,687
PB85-135382/GAR PC E07/MF E01
Beak Consultants Ltd., Toronto (Ontario).
Indoor Air Quality: 20 Existing Homes.
Jun 84, 129p ISBN-0-7743-9765-9
Sponsored in part by Ontario Ministry of Municipal Affairs and Housing, Toronto, and Ontario Ministry of Energy, Toronto.

The intent of the project was to quickly measure air quality conditions in the homes to ascertain if any problems existed. Measurements of the common contaminants, carbon monoxide, carbon dioxide, oxides of nitrogen, radon and its daughter products, and formaldehyde, were undertaken in each home. Average concentration of these contaminants in the air was measured. Additional work was carried out to measure the air exchange rates, the relative humidity and temperature and to ascertain the operation of combustion appliances in the various homes. Attempts were also made to gather information on the lifestyle of the residents to ascertain if this affected the indoor air quality. After commencing the sampling, the field technician assisted the home owner in completing the questionnaire that had been designed specifically for the project. This uniform approach reduced the bias typically found in survey data while maximizing the data recovery.

513,688
PB85-135820/GAR PC A05/MF A01
Carlow Associates, Inc., Fairfax, VA.
Photometric Tests of Daytime Running Lights.
Final rept. Oct 83-Feb 84,
M. Kirkpatrick, C. C. Heasly, and J. R. Bathurst. Feb 84, 78p DOT-HS-806 620
Contract DTNH22-83-C-07334

Current and prior field test data suggest that use of daytime running lights on operating vehicles can reduce the frequency and severity of collisions. Photometric measurements were taken using parking lamp units from vehicles currently being used in daytime running light field tests. Data can be used in the final analysis of test results to evaluate the functional relationship between daytime running light output and accident rate.

513,689
PB85-136323/GAR PC E04/MF E01
Consumers' Gas Co. Ltd., Toronto (Ontario).
Final Report on the Field Operation of a High Efficiency Condensing Gas Furnace.
Nov 83, 44p ISBN-0-7743-9764-0, R-2C
Sponsored by Ontario Ministry of Municipal Affairs and Housing, Toronto, and Ontario Ministry of Energy, Toronto.

The Ontario Ministry of Municipal Affairs and Housing and the Consumers' Gas Company Ltd. share a mutual interest in the performance, reliability and acceptability of the new market entry models of energy-efficient condensing residential-sized gas furnaces. As a result of this mutual interest, two of these furnaces were tested over the 1981/1982/1983 heating seasons on a fifty-fifty funding basis. The furnaces were installed in the greater Metropolitan Toronto area, one in Scarborough, one in Markham, and were compared to hard-reference electric furnaces of as near as possible equal input capacities. At each site the gas and electric furnaces were operated on a daily change-over basis, alternating operation every 24 hours over the heating seasons.

513,690
PB85-136836/GAR PC E04/MF E01
Enerplan Consultants, Toronto (Ontario).
Condensing Oil Furnace Field Test: Installation Report No. 11A.
Mar 84, 28p ISBN-0-7743-9762-4
Sponsored by Ontario Ministry of Municipal Affairs and Housing, Toronto and Ontario Ministry of Energy, Toronto.

The report describes study objectives, testing procedures and installation details for a field test of a high efficiency condensing oil furnace which has recently been developed for the domestic market. The field test is designed to generate data on the seasonal operating efficiency of the furnace. In addition, the test will provide an opportunity to assess the effects of extended use on furnace parts and operating characteristics, and to document service and maintenance requirements.

513,691
PB85-136844/GAR PC E04/MF E01
Union Gas Ltd., Toronto (Ontario).
Residential Condensing Gas Furnace Field Study: Installation Report No. 12A.
May 84, 30p ISBN-0-7743-9760-8
Sponsored by Ontario Ministry of Municipal Affairs and Housing, Toronto and Ontario Ministry of Energy, Toronto.

With a mutual interest in the energy savings potential of condensing gas furnaces, Union Gas Limited and the Ministry of Municipal Affairs and Housing, through funds provided by the Ministry of Energy, have entered into an agreement to field test such a furnace. Under investigation is the relative performance, both in terms of reliability and energy use, of a commercially available condensing unit with respect to conventional gas and electric heating.

513,692
PB85-139400/GAR PC E03/MF E03
Building Services Research and Information Association, Bracknell (England).
Unvented Hot Water Systems.
Technical memo,
D. Gregory. c1984, 14p BSRIA/TM-1/84

A draft of proposed new model water bylaws, currently out for comment, permits the use of unvented or pressurized hot water systems, hitherto illegal in this country. Although such systems are in routine use in other countries, significant controversy and confusion seems to exist about the safety and design code requirements. This document presents an independent and unbiassed report of the potential advantages and disadvantages, the inherent safety problems and the means used to insure against accident, and reviews what codes and guidance manuals exist or are in preparation. BSRIA is not involved in the marketing or selling of plumbing equipment. The document reports the opinions of others on the relative merits of different systems, then considers the potential future of unvented systems in the UK and makes recommendations for near term action. (Copyright (c) BSRIA May 1984.)

513,693
PB85-139418/GAR PC E03/MF E03
Building Services Research and Information Association, Bracknell (England).
Quality Assurance in Building Services.
Technical memo,
P. Scurry. c1983, 18p BSRIA/TM-1/83

Concern is expressed about the quality of the building services industry's product (e.g. a heating or ventilation system in a building) as perceived by the client. From a view that quality control and quality assurance (as defined) should extend beyond the factory produced product into design, installation, commissioning and maintenance a comprehensive analysis is given of the main features requiring attention. Work phases (design, specification, procurement, etc) are defined and discussed in respect of the procedures and responsibilities as they affect quality. A method of defining reliability is suggested leading to the proposal that a client can determine an acceptable cost/reliability relationship. Recommendations for research and development are given leading to the conclusion that such activities related to building services should be coordinated through a 'focal point'.

513,694
PB85-139459/GAR PC E03/MF E03
Building Services Research and Information Association, Bracknell (England).
Effect of Maintenance on Boiler Efficiency.
Technical note,
J. Armstrong, C. Gibbons, and P. Morgan. c1983, 22p BSRIA/TN-5/83, ISBN-0-86022-181-4

This study was carried out on fourteen boiler installations under site conditions by monitoring flue gas oxygen content and temperature together with ambient air temperature to enable the combustion loss to be calculated. By undertaking the tests on boilers in both clean and dirty conditions, and recording data every minute over a period of two to three days, representative mean combustion loss figures were obtained. (Copyright (c) BSRIA December 1983.)

513,695
PB85-139467/GAR PC E04/MF E04
Building Services Research and Information Association, Bracknell (England).
Heat Recovery and Heat Pumps in Buildings - A Guide for Buyers and Specifiers.
Technical note,
G. Hamilton, and J. Kew. c1983, 74p BSRIA/TN-4/83, ISBN-0-86022-171-7

Contents:
Air to air heat recovery;
Heat pumps and refrigeration plant heat recovery;
De-stratifying fans;
Hot waste gas heat recovery;
Liquid to liquid heat recovery;
Directory of equipment suppliers. (Copyright (c) BSRIA August 1983.)

513,696
PB85-141430 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Performances of Different Passive Solar Systems at the NBS (National Bureau of Standards) Test Facility.
Final rept.,
B. M. Mahajan, S. T. Liu, and K. A. Reed. 1984, 6p
Sponsored by Department of Energy, Washington, DC. Office of Solar Heat Technologies.
Pub. in American Society of Mechanical Engineers Technical Paper 84-WA/Sol-3, 6p 1984.

This paper compares the measured winter-time performances of three full-sized adjoining rooms each with a different south-facing passive solar feature. These rooms are a direct gain cell, a control cell, and a Trombe wall cell in the NBS passive solar test facility. The performances of these three cells were monitored for a period of three weeks during January-February, 1984 under the following experimental conditions: lower-bound temperature fixed and upper-bound temperature free floating in all cells; and vents of the Trombe wall blocked. During the experiment data from about 426 sensors are collected. The data include: auxiliary energy supplied, continuous air infiltration, temperatures, and wind speed and direction. This paper briefly describes the test facility, instrumentation, data acquisition system and procedures, and presents representative results from the performance monitoring experiment.

513,697
PB85-144905 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Impact of Building Codes and Regulations on Indoor Air Quality.
Final rept.,
P. E. McNall. 1984, 5p
Sponsored by American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta, GA.
Pub. in Proceedings of Engineering Foundation Conference on Management of Atmospheres in Tightly En-

closed Spaces, Santa Barbara, CA., October 17-21, 1983, p57-61 Jun 84.

In the United States there is a comprehensive complex and often inconsistent system of regulations which relates to building design, construction and occupancy. These regulations, in the various states, are examined to assess the technical bases for their ventilation provisions and to determine if they permit innovation in indoor and air quality technology.

513,698
PB85-145316 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Impact of a Retrofitted Heat Recovery Unit on an Existing Residential Heat Pump and Water Heater.
Final rept.,
K. M. Tu, and S. Fischler. 1980, 25p
Sponsored by Oak Ridge National Lab., TN.
Pub. in Proceedings of Conference Waste Heat Recovery for Energy Conservation - Residential and Light Commercial Heat Pumps, Air Conditioning, and Refrigeration Systems, West Lafa yette, IN., September 15-17, 1980, p 55-79.

Two heat recovery units were retrofitted, one at a time, with one heat pump and one storage-type water heater to produce two integrated heat pump - heat recovery unit - water heater systems. Each system was operated with appropriate measuring devices to determine the effect(s) of using the 'retrofit' heat recovery unit on the performance of the heat pump and water heater. The system was operated with the outdoor unit of the heat pump in an environmental chamber with 'outdoor temperatures' of 75, 85, 95, and 20F. The indoor unit of the heat pump was in an environmental chamber whose 'indoor temperature' was set at 80F when the outdoor temperature was 75, 85, 95F, and 70F when the outdoor temperature was set at 20F. The indoor relative humidity was maintained at approximately 50%. The heat recovery unit and water heater were in an environmental chamber set at the 'basement temperature' of 65F with 50% relative humidity.

513,699
PB85-145407 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Climate Data Abbreviation for the Computerised Calculation of Heating and Cooling Requirements in Buildings.
Final rept.,
D. H. Nall, and E. A. Arens. 1979, 15p
See also PB-289 927.
Pub. in Energy and Buildings 2, n2 p135-149 Apr 79.

This paper documents the development of a climate data abbreviation technique for building thermal analysis. The paper first discusses the need for and requirements of abbreviated data. The technique is then described together with the statistical analyses used to develop it. A series of tests of the representativeness of the abbreviated climate data are documented. Finally, the limitations and potentials of the abbreviation technique are discussed.

513,700
PB85-149813/GAR PC **A06**/MF **A01**
Advanced Mechanical Technology, Inc., Newton, MA.
High-Efficiency Commercial Water Heater Development.
Final rept. Nov 80-Aug 84,
E. P. Demetri, M. P. Sespaniak, and J. Gerstmann.
Nov 84, 106p GRI-84/0188
Contract GRI-5083-241-0868
See also PB84-174713.

The development of a condensing water heater for commercial applications has been completed. The selected concept consists of a high-efficiency water heater connected by appropriate plumbing to a stratified-temperature storage tank. A number of pre-production prototypes were fabricated and installed at nine representative commercial sites. Field tests were initiated in April 1983 and concluded in July 1984. These consisted of a side-by-side comparison with the existing conventional water heater at each site. The final test results obtained demonstrate standby loss rates less than one-fifth of conventional values and service efficiencies which average 32% higher than conventional system efficiencies. The comparative performance data obtained under actual usage conditions show that the condensing water heater would provide average annual cost savings of $920 per year and corresponding paybacks in the range of 0.9-1.5 years.

513,701
PB85-149847/GAR PC **A04**/MF **A01**
Battelle Columbus Labs., OH.
Effect of Water Quality on Residential Water Heater Life-Cycle Efficiency.
Annual rept. Sep 83-Aug 84,
G. H. Stickford, S. G. Talbert, D. C. Newman, J. H. Payer, and B. W. Vigon. Oct 84, 57p GRI-84/0202
Contract GRI-5082-241-0715
See also PB84-143098.

A 3-year field test program is under way for the Gas Research Institute to quantify the effect of scale buildup on the performance of residential water heaters, and to determine the benefits and limitations of common water treatment methods. In this program, the performance of gas and electric heaters is being monitored in test laboratories set up in selected U.S. cities. The efficiency of heaters operating on hard water is measured and compared with the performance of heaters operating on treated water. Corrosion tests are also being conducted on each type of water tested to determine the effect of water treatment on the corrosion of the water heating system. During this reporting period Battelle has established operating hard water test facilities at four test sites: (1) Battelle, (2) the Roswell Test Facility in Roswell, New Mexico, (3) the Water Quality Association in Lisle, Illinois, and (4) the Marshall Municipal Utilities in Marshall, Minnesota. At each of these sites 12 water heaters have been installed and are operating on accelerated draw cycles. The recovery efficiency of each heater has been carefully measured, and the heaters have been operating from 4 months at one site to 7 months at another. At two of the test sites, the recovery efficiency of each heater has been remeasured after 6 months of operation. No significant degradation in heater performance due to scale buildup was observed in these heaters for the equivalent of 2 to 3 years of typical residential use.

513,702
PB85-854313/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Microprocessors: HVAC System Control. 1979-January 1985 (Citations from the Energy Data Base).
Rept. for 1979-Jan 85.
Jan 85, 65p
Supersedes PB84-858497. Prepared in cooperation with Department of Energy, Washington, DC.

This bibliography contains citations concerning the utilization of microprocessors for the control of residential and commercial heating, ventilation, and air conditioning (HVAC) systems. Topics include the control of active and passive solar equipment, heat pumps, and demand limiters. Some attention is given to industrial heating equipment and optimizing devices. (This updated bibliography contains 74 citations, 13 of which are new entries to the previous edition.)

513,703
PB85-854677/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Industrial Heating Technology. June 1970-July 1983 (Citations from the Engineering Index Data Base).
Rept. for Jun 70-Jul 83.
Jan 85, 312p

This bibliography contains citations concerning the design, development, and application of industrial heating technology. Solar, oil, gas, electrial, and microwave systems in industrial applications are discussed. (This updated bibliography contains 332 citations, none of which are new entries to the previous edition.)

513,704
PB85-854685/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Industrial Heating Technology. August 1983-January 1985 (Citations from the Engineering Index Data Base).
Rept. for Aug 83-Jan 85.
Jan 85, 38p
Supersedes PB83-868422.

This bibliography contains citations concerning the design, development, and application of industrial heating technology. Solar, oil, gas, electrical, and microwave systems in industrial applications are discussed. (This updated bibliography contains 47 citations, all of which are new entries to the previous edition.)

13B. Civil Engineering

513,705
AD-A148 632/3/GAR PC **A06**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Measured Plume Dispersion Parameters Over Water. Volume 1.
Final rept. Oct 83-Oct 84,
C. E. Skupniewicz, and G. E. Schacher. Sep 84, 108p Rept no. NPS-61-84-012

The Minerals Management Service sponsored a series of four atmospheric tracer experiments at California coastal locations over a two-year span, 1980-1982. These experiments were designed to assess air pollution impact from proposed oil exploration and drilling activities along the continental shelf. Two experiments (winter and summer) at each of two sites (open coast and Santa Barbara Channel) were funded in order to investigate air quality impact under a range of meteorological conditions and sites. The basic designs of all four experiments were similar. A tracer gas, 100% SF6, was continuously released from a stationary, sea surface platform located, for the majority of the experiments approximately 3 miles from shore. During parts of the last experiment, the platform was moved to distances up to 5 miles from shore. This volume analyzes the collected data. The tracer plume is characterized by a variety of parameters, including the conventional hourly averaged sigma-y and sigma-z values widely used in Gaussian plume dispersion formulae. Gaseous dispersion is parameterized for the over-water case by classifying the tracer results by stability in a Pasquill-Gifford equivalent scheme, and analytically describing horizontal and vertical plume growth as a function of plume travel distance. Several other over-water data sets are used in this parameterization. Comparisons are made to the over land case.

513,706
AD-A148 675/2/GAR PC **A15**/MF **A01**
Army Engineer District, Portland, OR.
Alternative Strategies for a Permanent Outlet for Spirit Lake Near Mount St. Helens, Washington.
Final environmental impact statement.
Apr 84, 345p

The natural outlet of Spirit Lake, located approximately 4 miles north of Mount St. Helens, Washington, was blocked by a debris avalanche created by the May 18, 1980, eruption of the mountain. The water level in Spirit Lake is being maintained at an elevation of approximately 3460 feet by a temporary pumping facility. However, the blockage could fail, causing catastrophic flooding and mudflows downstream on the Toutle and Cowlitz Rivers. The Army Engineer Portland District, Portland, is examining six alternatives for a permanent outlet for Spirit Lake to prevent failure of the blockage: (1) an open channel across the blockage to the North Fork Toutle River; (2) a gravity-fed conduit buried in a trench through the blockage to the North Fort Toutle River; (3) a permanent pumping facility with a buried pipe across the blockage to the North Fork Toutle River; (4) a tunnel excavated through rock to the North Fork Toutle River; (5) a tunnel excavated through rock to South Coldwater Creek, a tributary to North Fork Toutle River (the preferred alternative); and (6) a tunnel through rock to Smith Creek in the Lewis River drainage basin. The 'no action' alternative is also being considered. All of the alternatives being considered would affect the Mount St. Helens National Volcanic Monument. Originator-supplied keywords include: Outlet works, Water tunnels, Flood control, Landslide dams, Dam failure, and Environmental impact statement.

513,707
AD-A148 687/7/GAR MF **A01**
Weston (Roy F.), Inc., West Chester, PA.

Installation Restoration Program. Phase II Stage I Study McGuire Air Force Base, Burlington County, New Jersey.
Final rept.
Oct 84, 325p
Contract F33615-80-D-4006
Availability: Microfiche copies only.

This report covers the second part (Phase II) of the Installation Restoration Program (IRP) confirmation study at McGuire AFB NJ. This study was directed by the Department of Defense. The overall objective of the IRP is to identify and evaluate past disposal sites and to control the migration of hazardous environmental contamination resulting from such sites. This work may be followed by a Phase IIa effort to define the extent of contaminated migration in those cases where this question has not been answered.

513,708
AD-A148 701/6/GAR PC A04/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS. Hydraulics Lab.
Investigation and Discussion of Techniques for Hypolimnion Aeration/Oxygenation.
Final rept.,
J. P. Holland, and C. H. Tate, Jr. Oct 84, 57p Rept no. WES/TR/HL-E-84-10

This report examines elements of the design and operation of hypolimnetic aeration systems. Three basic types of hypolimnetic aerators are identified, and pertinent literature for each is reviewed. Hypolimnetic aeration with pure oxygen (i.e. hypolimnetic oxygenation) at Clarks Hill Reservoir, Georgia-South Carolina, is overviewed. Included are results of hypolimnetic aeration field test conducted by contractors and the US Army Corps of Engineers at Clarks Hill. Results from these test showed that, for hypolimnetic oxygenation to most effectively enhance downstream release, most of the input oxygen should be placed (1) within the hypolimnetic withdrawal zone and (2) by a linear diffuser. A number of hypolimnetic aerator designs are considered. The use of numerical simulation techniques to predict idealized values for aerator design is also discussed. A combination of such results from the Clarks Hill field tests and numerical simulation efforts has produced the initial design for a hypolimnetic oxygenation system at Richard B. Russell Reservoir, South Carolina-Georgia, which is presented herein.

513,709
AD-A148 736/2/GAR PC A02/MF A01
Cold Regions Research and Engineering Lab., Hanover, NH.
Engineer's Pothole Repair Guide,
Technical digest,
R. A. Eaton, E. A. Wright, and W. E. Mongeon. Mar 84, 15p Rept no. CRREL-84-1

No abstract available.

513,710
AD-A148 742/0/GAR PC A04/MF A01
Cambridge Univ. (England). Dept. of Engineering.
Stability of Low Embankments on Soft Clay. Part 2. Studies of Vane and Penetrometer Tests during Centrifuge Flight.
Final technical rept.,
M. S. S. Almeida, and R. H. G. Parry. Nov 84, 57p
Contract DAJA37-82-C-0177
See also Part 3, AD-A148 743.

Correct assessment of soil parameters in centrifuge tests requires these to be measured during flight, and small vane and penetrometer devices have been developed for this purpose. The vane is fixed in position, but the penetrometer can traverse the length of the model, allowing tests to be made a different locations. A programme of tests has been conducted in the centrifuge at 100 g investigating the use of these test methods in consolidated beds of clay. Rate effects are studied for both types of tests and correlations made between cone resistance and undrained shear strength measured by the vane. A number of penetration tests were also performed to show the progressive increase in strength of a clay bed under staged embankment construction.

513,711
AD-A148 743/8/GAR PC A05/MF A01
Cambridge Univ. (England). Dept. of Engineering.
Stability of Low Embankments on Soft Clay. Part 3. Centrifuge Tests and Numerical Analysis.
Final technical rept. Jun 82-Sep 84,
M. S. S. Almeida, and R. H. G. Parry. Nov 84, 165p
Contract DAJA37-82-C-0177
See also Part 1, AD-A148 741.

Centrifuge tests have been conducted to study the behaviour of embankments on soft clay and to provide quantitative data against which to test the predictive power of the Cambridge CRISP program. Soft clay foundations were prepared with an overconsolidated crust over normally consolidated kaolin clay. Methods of conducting site investigation tests on this clay have been described in Parts 1 and 2. Tests were performed both with embankments constructed during flight in stages and in a single lift to failure, with measures of pore pressures at selected locations, and displacements using a marker grid. Some tests were performed with the clay foundation strengthened using granular columns. An embankment built in a single lift, on unstrengthened clay failed at a height of 11.6m before inducing failure. Heights of 13m were achieved with stage constructed embankments on strengthened foundations, but without any failure occurring. Unexpected large lateral displacements were measured in unstrengthened clay during consolidation periods. Large displacement increases are a good indicator of factor of safety below about 1.3. At corresponding loading the use of strengthened foundations decreased lateral and vertical movements by about 50.

513,712
AD-A148 780/0/GAR PC A03/MF A01
Corps of Engineers, Omaha, NE. Missouri River Div.
Laboratory Investigation of Vane Dike River Control Structures.
Hydraulic laboratory series rept.
Sep 84, 43p Rept no. MRD-11

Presented in this report are the results of a model study on river training structures called vane dikes. The purpose of this investigation was to determine the relative effects of vane dikes on the flow distribution and bed configuration of a typical Missouri River bend. Different structure arrangements were tested to determine the optimum van dike configuration by which the flow could be diverted away from the bank. Tests were also conducted to determine the effectiveness of the vane dike structures in the removal of point bars along convex banks and the variations in the sediment deposition landward (wet lands) of the vane dikes under various combinations of vane and gap lengths.

513,713
AD-A148 815/4/GAR PC A11/MF A01
URS Co., Seattle, WA.
Long-Term Impacts Induced by Disposal of Contaminated River Sediments in Elliott Bay, Seattle, Washington.
Final rept.,
R. N. Dexter, D. E. Anderson, and E. A. Quinlan. Sep 84, 227p WES/TR/D-84-4
Contract DACW39-79-C-0038

Long-term trends in the physical, chemical, and biological characteristics of dredged material at a deepwater, experimental disposal site in Elliott Bay, Seattle, Washington, were studied. This site was studied previously as part of the US Army Corps of Engineers Dredged Material Research Program which determined the behavior of dredged material during disposal and characterized its impact over the following 9 months. The site was selected for additional work for a number of reasons. The dredged sediments contained high concentrations of polychlorinated biphenyls (PCBs) and the benthic community did not recover to predisposal conditions during the original study. Results of this study provide a basis for a realistic evaluation of the environmental impacts of open-water dredged material disposal and thus assist in establishing environmentally sound management strategies for future disposal activities.

513,714
AD-A148 839/4/GAR PC A04/MF A01
Construction Engineering Research Lab. (Army), Champaign, IL.
Closed-Loop Concepts for the Army: Water Conservation, Recycle, and Reuse.
Final rept.,
E. D. Smith, J. T. Bandy, W. P. Gardiner, and F. Huff. Nov 84, 55p Rept no. CERL-TR-N-85/01

Potential commitment of U.S. Army troops in the Middle East and Southwest Asia has raised the issue of water supply in the success of combat operations. Moreover, increased demands for water in the face of growing ground and surface water pollution, changes in global weather patterns, and expanding agriculture may affect the Army's mission in the future both at home and abroad. Coupled with increasing costs for potable water and outside wastewater treatment, this outlook suggests a clear need for conservative water use at Army installations. To update existing regulations for Department of Defense facilities, a closed-loop approach is proposed. Water conservation, recycling, and reuse in various combinations can be initiated to reduce the need for fresh water and simultaneously cut the cost of heating wasted water. The closed-loop measures applying to a given installation must be determined individually. Factors such as geography, climate, population numbers, and mission are assessed and then the feasibility of each conservation, recycle, and reuse measures is judged. Possibilities for using closed-loop technology are explored for several types of Army installations.

513,715
DE84016510/GAR PC A02
Kent State Univ., OH. Dept. of Physics.
Transport of Binary Mixtures of Trace Contaminants Through an Adsorber Bed.
R. Modey, J. C. Huang, D. Rothstein, and B. G. Wu. 1983, 10p CONF-8307133-1
Contract AC02-80ER10622
13. intersociety conference on environmental systems, San Francisco, CA, USA, 11 Jul 1983.
Paper copy only, copy does not permit microfiche production.

A second-order partial differential equation governs the transport of an adsorbate through a porous medium. The gas-phase concentration and the solid-phase concentration parameters were studied in the case of a binary mixture of gases. 22 references, 9 figures. (ERA citation 10:005301)

513,716
DE85000065/GAR PC A02/MF A01
Argonne National Lab., IL.
What Restoration Ecology Can Tell US About Mycorrhizs.
R. M. Miller. 1984, 6p CONF-8410148-1
Contract W-31-109-ENG-38
Restoration ecology: theory and practice, Madison, WI, USA, 11 Oct 1984.

Research is summarized on how different topsoil handling procedures influence mycorrhizal propagule survival. The relationship of mycorrhiza to plant establishment and survival is also discussed. (ERA citation 09:050549)

513,717
DE85001536/GAR PC A03/MF A01
Oak Ridge National Lab., TN.
Evaluation of the Proposed Y-12 Steam Plant Wastewater Treatment System.
J. F. Walker, C. H. Brown, and G. B. Dinsmore. Sep 84, 46p ORNL/TM-9234
Contract AC05-84OR21400

A wastewater treatment facility has been conceptually designed to treat the Y-12 steam plant and ancillary effluents to meet the Clean Water Act's Best Available Technology limitations. This report presents the results of a program to acquire representative samples of the major effluents to be treated in this facility, to characterize these samples, and to perform a benchscale evaluation of the conceptual design flowsheet. Results indicate the wastewater can be successfully treated with Ca(OH) sub 2 to remove all pollutants, except copper, silver, and TSS to levels specified in the probable Limits for Y-12 Process Waste Discharges to East Fork Popular Creek. Flocculation of the sludge produced by the Ca(OH) sub 2 coagulation with PURIFLOC A23 reduces sludge volume by approx. 69%. Results also indicate that vacuum filtration is a better alternative than centrifugation for dewatering the sludge. 16 references, 10 figures, 7 tables. (ERA citation 10:003355)

513,718
DE85001682/GAR PC A03/MF A01
Washington Univ., Seattle. Dept. of Oceanography.

Hydrocarbon Studies in Puget Sound and off the Washington Coast. Report of Progress, March 1978-February 1979.
R. Carpenter, and A. W. Fairhall. Feb 79, 44p DOE/EV/70040-T1
Contract AT06-76EV70040
Portions are illegible in microfiche products.

This report summarizes the past year's progress in studies of the amounts, types and probable origins of aliphatic, aromatic, S- and N-containing hydrocarbons in sediments, organisms, and waters of Puget Sound and the Washington coast. We are trying to identify the relative importance of the various possible sources of these substances, the major pathways by which they are transferred through some parts of the marine food web, their rates of transfer, and their ultimate fates. We have found that changes in aliphatic and aromatic hydrocarbon compositions are evident in exp 210 Pb-dated sediment cores from central Puget Sound. These changes are due both to natural diagenetic processes and to low-level inputs of fossil fuels from a variety of sources. We have found measurable amounts of both S- and N-containing compounds in these Puget Sound sediments. Our studies of the role of zooplankton fecal pellets in the cycling of trace chemicals in the sea have shown that fecal pellets are an important vertical transport agent for hydrocarbons in the sea. We now have defined the natural variations in exp 14 C and exp 13 C/ exp 12 C isotope ratios of the inorganic carbon in Puget Sound seawater. Carbon isotope abundances for organisms and sediments are also reported for selected sites. 60 references, 10 figures. (ERA citation 10:003352)

513,719
DE85001683/GAR PC **A02**/MF **A01**
Washington Univ., Seattle. Dept. of Oceanography.
Hydrocarbon Studies in Puget Sound and off the Washington Coast. Report of Progress, March 1981-May 1982.
R. Carpenter. Jun 82, 14p DOE/EV/70040-T2
Contract AT06-76EV70040
Portions are illegible in microfiche products.

This report summarizes the past year's progress in studies of the amounts, types and probable origins of aliphatic, aromatic, S- and N-containing hydrocarbons in sediments, organisms and waters of Puget Sound and the Washington coast. We are identifying the relative importance of the various possible sources of these substances, the major pathways by which they are transferred through some parts of the marine food web, their rates of transfer, their possible transformations into other chemical forms, and their ultimate fates. We have found that changes in aliphatic, aromatic and N-containing hydrocarbons are evident with depth in exp 210 Pb-dated sediment cores from central Puget Sound. These changes are due both to natural diagenetic processes and to low level inputs of fossil hydrocarbons from a variety of energy related activities. The presence of these hydrocarbons from various chronic sources must be considered and taken into account when assessing potential impacts of any future oil spills or refinery or transshipment terminals proposed for future development. The greatest polynuclear aromatic hydrocarbon fluxes are to central Puget Sound sediments near the major urban areas, rather than in northern Puget Sound near the major refineries. We have found S-containing hydrocarbons in Puget Sound sediments which are largely due to natural sources. In contrast, N-containing hydrocarbons appear largely due to anthropogenic inputs, probably from atmospheric dusts rich in these compounds from combustion processes. The N-containing azaarenes are especially enriched in layers of sediment containing coal particles and may turn out to be good indicators of coal dust contamination of sediments. Our studies of the role of zooplankton fecal pellets in the cycling of trace chemicals in the sea have shown that fecal pellets are an important vertical transport agent for hydrocarbons. 4 figures. (ERA citation 10:003353)

513,720
DE85002372/GAR PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Comparison of MESOI Atmospheric Dispersion Estimates with Data and Estimates from Other Models.
J. V. Ramsdell, C. S. Glantz, and G. L. Andrews. Oct 84, 13p PNL-SA-12670, CONF-8410165-2
Contract AC06-76RL01830
DOE model validation workshop, Charleston, SC, USA, 23 Oct 1984.

The magnitudes and positions of maximum short-term concentrations estimated by the MESOI and straight-line Gaussian dispersion models are compared with the magnitudes and positions of concentration maxima observed following 14 tracer releases at the DOE Savannah River Laboratory. Diffusion classes were selected using NRC temperature difference and sigma theta criteria. The models' performances are compared statistically using analysis of variance and paired t-tests. The best performance is by the MESOI model using the split-sigma approach to selection of diffusion classes; the geometric mean ratio between the model's concentration predictions and the observed concentrations is 1.1. The split-sigma approach to selecting diffusion classes is found to be significantly better than the temperature difference approach. 3 references, 5 tables. (ERA citation 10:003267)

513,721
DE85002374/GAR PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Experimental Evaluation of Plume Depletion Models.
T. W. Horst, and J. C. Doran. Jun 84, 5p PNL-SA-12153, CONF-841059-12
Contract AC06-76RL01830
American Meteorological Society conference on mountain meteorology, Portland, OR, USA, 15 Oct 1984.

In this paper we describe a field measurement program for the evaluation of plume depletion models using simultaneously released, depositing and nondepositing tracers. The testing of such models requires at least three kinds of information: a description of the meteorology that governs atmospheric transport and diffusion, an estimate of how rapidly the material of interest deposits to the surface, and a measurement of the airborne concentration distributions that result from the atmospheric diffusion and deposition of this material. The second requirement is particularly troublesome, since estimates of deposition rates vary over several orders of magnitude. Data were obtained from six dual-tracer releases during moderately stable to near-neutral conditions. The behavior of the nondepositing tracer was used to deduce the diffusion meteorology, while both tracers were used to determine C/ sub d//C/sub o/, the ratio of the crosswind-integrated, depositing and nondepositing tracer concentrations. The deposition velocity of the depositing tracer was also obtained from the dual-tracer concentrations, using a novel method based on the surface depletion model of Horst (1977). The measured values of C/sub d//C/sub o/, were then compared to the predicted values for each of four Gaussian plume-depletion models. (ERA citation 10:003286)

513,722
DE85002648/GAR PC **A05**/MF **A01**
Argonne National Lab., IL.
Study of Pollutant Dispersion in an Urban Street Canyon.
F. T. DePaul, and C. M. Sheih. Oct 84, 90p ANL/ER-84-1
Contract W-31-109-ENG-38

Pollutant dispersion from an urban street canyon was studied to determine the process by which pollutants emitted at street level are transported from the canyon and to quantify the net rate of pollutant exchange between the canyon and the upper air. The experiments were performed in a street canyon with a building height to street width ratio of 1.5 and with ambient winds perpendicular to the street. To examine pollutant transport within the canyon, mean wind velocities were determined by analyzing the trajectories of tracer balloons that were released in the canyon and photographed in rapid sequence. The trajectories indicate the presence of a primary vortex cell, provided the ambient wind velocity exceeds 1.5 to 2.0 m s exp -1 . The measurements indicate that while pollutant mixing within the canyon occurs rapidly by mean wind advection, the final transport of material normal to the roof-level plane is accomplished by turbulent motions. To determine the net rate of pollutant exchange between the street canyon and upper air, a tracer study was conducted. The tracer study was performed by releasing a controlled amount of SF sub 6 gas near the street. From the measurement sof tracer decay, retention times, defined as the length of time for a pollutant concentration to reduce to e exp -1 of its original value, were computed. The retention times were found to be of the order of minutes for ambient winds between 1.7 and 4.5 m s exp -1 . The vertical pollutant flux near midblock was quantified by a ventilation velocity representing the average velocity of pollutant transported out of the canyon. The ventilation velocities were computed from the retention times and found to range between 15 and 80 cm s exp -1 . Meteorological measurements of the ambient flow were also taken and a semi-empirical formula for predicting street-level pollutant concentrations was developed from the data. 47 references, 25 figures, 2 tables. (ERA citation 10:003247)

513,723
DE85002649/GAR PC **A04**/MF **A01**
Argonne National Lab., IL.
Evaluation of Recent SO/sub X/ and NO/sub X/ Emission Inventories.
D. M. Rote, and K. C. Chun. May 84, 73p ANL/ES-142
Contract W-31-109-ENG-38
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Several recent emission inventories are examined in detail in this report, with particular emphasis on analyzing estimates of NO/sub x/ and SO/sub x/ emissions. The NEDS, NAPAP, SURE, MAP3S, NECRMP, and WG3B inventories are described and compared qualitatively in terms of their time frames, geographic coverages, pollutants inventoried, data sources, emission factors, and approaches to spatial and temporal resolution. Improvements over earlier inventories and remaining limitations also discussed. The above inventories are also compared quantitatively at the national level by major source category and fuel type, with emphasis on natural-gas-fired sources. Discrepancies are noted and discussed. Sources of error and uncertainty in emission inventories are described in qualitative terms. Also, procedures for quantitatively expressing and evaluating uncertainty are described in detail, after which selected results obtained through error analysis of the various emission inventories are commented on briefly. Several source categories of special interest to the natural gas utility industry, including those of natural gas appliances and certain industrial sources, are examined in some detail. Conclusions are drawn and recommendations are made for additional related tasks for both the short and longer term. 43 references, 22 tables. (ERA citation 10:003248)

513,724
N85-12480/8/GAR PC **A09**/MF **A01**
Hamilton Standard, Windsor Locks, CT.
Development of a Preprototype Times Wastewater Recovery Subsystem.
Final Report.
G. J. Roebelen, and G. F. Dehner. Feb 82, 195p
NAS 1.26:171815, SVHSER-7236, NASA-CR-171815
Contract NAS9-15471

A three-man wastewater recovery preprototype subsystem using a hollow fiber membrane evaporator with a thermoelectric heat pump to provide efficient potable water recovery from wastewater on extended duration space flights was designed, fabricated, and tested at one-gravity. Low power, compactness and gravity insensitive operation are featured in this vacuum distillation subsystem. The tubular hollow fiber elements provide positive liquid/gas phase control with no moving parts, and provide structural integrity, improving on previous flat sheet membrane designs. A thermoelectric heat pump provides latent energy recovery. Application and integration of these key elements solved problems inherent in all previous reclamation subsystem designs.

513,725
N85-12481/6/GAR PC **A06**/MF **A01**
Hamilton Standard, Windsor Locks, CT.
Addendum: Development of a Preprototype Times Wastewater Recovery Subsystem.
Final Report.
G. F. Dehner. Feb 82, 112p NAS 1.26:171816, SVHSER-7236-ADD, NASA-CR-171816
Contract NAS9-15471

The results of the second generation operational improvements and the TIMES (Thermoelectric Integrated Membrane Evaporation Subsystem) 2 study are covered. Areas covered in the second generation operational improvements are improved temperature control, water quality improvements, subsytem operational improvements, solid handling improvements, wastewater pretreatment optimization, and membrane rejuvenation concepts. The task for the TIMES 2 study are thermoelectric regenerator improvement, recycle

loop pH operational criteria, recycle loop component optimization, and hollow fiber membrane evaporator improvement. Results are presented and conclusions are drawn from both studies.

513,726

N85-12482/4/GAR PC A10/MF A01
Hamilton Standard, Windsor Locks, CT.
Development of a Preprototype Times Wastewater Recovery Subsystem: Appendices.
Final Report.
G. J. Roebelen, and G. F. Dehner. Feb 82, 206p
NAS 1.26:171817, SVHSER-7236-APP, NASA-CR-171817
Contract NAS9-15471

This Master Test Plan outlines the test program to be performed by Hamilton Standard during the Urine Water Recovery Subsystem Program. Testing is divided into three phases: (1) design support testing; development component testing; and acceptance testing. The completion of this test program verifies the subsystem operation.

513,727

N85-12542/5/GAR PC A05/MF A01
Institute of Oceanographic Sciences, Birkenhead (England).
Parameterizing Extreme Still Water Levels and Waves in Design Level Studies.
G. A. Aucock. 1984, 97p IOS-183

The state of the art in parameterizing and estimating extreme still water level (SWL), extreme waves, and their combination for sea flood prevention projects is reviewed. Prediction methods based on analysis of extreme values of SWL, on joint probability, and on interpolation of extreme SWL estimates are discussed. Difficulties in predicting wave statistics, given the lack of observed wave data, are considered.

513,728

PB85-132314/GAR PC E05/MF E01
Studiecentrum Verkeerstechniek, Driebergen (Netherlands).
Ontsluitingswegen in Verblijfsgebieden: Een Zoeksysteem voor Verkeerstechnische Maatregelen (Distributor Roads within Residential Areas: A System for Selection of Traffic Engineering Measures).
1983, 78p MEDEDELING-21, ISBN-90-6628-016-6
Text in Dutch.
Available outside the North American Continent from Institute for Road Safety Research, SWOV-P.O. Box 170, 2260 AD Leidschendam, The Netherlands.

At the Study Center for Traffic Engineering a working party on the design of access roads within residential areas was set up in 1979. It had the task of formulating a series of recommendations for the (re)design of distributor roads within residential areas. The term residential or 'socializing' area is taken to include shops, post offices etc. More specifically it is an area where the social function determines a right of way for pedestrians and cyclists. Chapter 2 discusses how to define a residential area and those aspects of slow traffic which are relevant. Chapter 3 discusses which aspects of road and motor traffic are relevant. Chapter 4 presents a method of selecting measures to deal with the potential conflicts between slow traffic on one side and motor traffic on the other. In Chapter 5 some of these measures are presented.

513,729

PB85-132330/GAR PC E04/MF E01
Studiecentrum Verkeerstechniek, Driebergen (Netherlands).
Criteria voor het Plaatsen van Verkeerslichten Buiten de Bebouwde Kom (Criteria for the Installation of Traffic Signals Outside Built-Up Areas).
1983, 75p MEDEDELING-22, ISBN-90-6628-017-4
Text in Dutch.
Available outside the North American Continent from Institute for Road Safety Research, SWOV-P.O. Box 170, 2260 AD Leidschendam, The Netherlands.

This report deals with criteria for traffic signal installation on rural intersections. However, much of the information applies to urban areas as well. The criteria involve the following influences on signal installation: traffic flow, accident rates and perception of safety, noise and air-pollution, energy consumption, cost of installation and maintenance. The concluding chapter describes ways of combining these different criteria.

513,730

PB85-135044/GAR PC A04/MF A01
California State Dept. of Transportation, Sacramento. Office of Transportation Lab.
California's Thin Bonded PCC (Portland Cement Concrete) Overlay.
B. F. Neal. Jun 83, 54p TL-633352, FHWA/CA/TL-83/04

Details of a thin bonded PCC overlay of a 17 year old PCC pavement are presented. The location was on I-80 near Truckee at 6500-7000 ft elevation. Due to the extent of bond failure, the project is considered to have 'failed', and was overlaid with AC. Results of the failure investigation to date are also given.

513,731

PB85-135671/GAR PC A04/MF A01
Construction Technology Labs., Skokie, IL.
Effect of Concrete Shoulders on Concrete Pavement Performance.
Interim rept. 1982-83,
S. D. Tayabji, C. G. Bell, and P. A. Okamoto. Oct 83, 57p FHWA/MN/RD-83/05
Also pub. as Minnesota Dept. of Transportation, St. Paul Investigation no. 209.

A field program of strain and deflection measurements was conducted. The objective of the program was to evaluate the effect of frozen support, tied-concrete shoulder, and tridem-axle loading on concrete pavement performance. Results of the study on the effect of tied-concrete shoulder are presented in this paper.

513,732

PB85-135697/GAR PC A04/MF A01
California Univ., Irvine. Inst. of Transportation Studies.
Organizational Form and Transit Performance: A Research Review and Empirical Analysis.
Final rept. Apr 83-Sep 84,
J. L. Perry. Sep 84, 70p UMTA-CA-11-0027-84-5
Grant DOT-UMTA-CA-11-0027
See also PB85-135705.

This study examines ownership-management structures and their relationships to transit performance. It addresses a number of policy-related questions: Should the trend toward public ownership of transit services be reversed. Can private contract management of public transit services capture the advantages of privatization. What trade-offs in performance, if any, are associated with the various forms of ownership and management.

513,733

PB85-135705/GAR PC A02/MF A01
California Univ., Irvine. Inst. of Transportation Studies.
Organizational Form and Transit Performance: A Research Review and Empirical Analysis. Executive Summary.
Final rept. Apr 83-Sep 84,
J. L. Perry. Sep 84, 10p UMTA-CA-11-0027-84-4
Grant DOT-UMTA-CA-11-0027
See also PB85-135697.

This research reports the results of a study of the relationships between ownership-management structure and transit agency performance. The performance of five different organizational forms was compared: publicly-managed general governments; publicly-managed special districts; contract-managed general governments; contract-managed special districts; and privately owned and managed systems. Eight performance dimensions were used for the comparisons: revenue generation; output per dollar; service consumption; public assistance; labor efficiency; vehicle efficiency; safety; and maintenance efficiency. Privately-owned and managed systems were found to be significantly more efficient than the other four types. The relative efficiency of contract-managed systems was no better than publicly-managed systems. In contrast to the efficiency results, private systems were significantly less safe than most types of publicly-owned systems. The report addresses the policy implications of the findings.

513,734

PB85-135762/GAR PC A03/MF A01
Construction Technology Labs., Skokie, IL.
Effect of Frozen Support on Concrete Pavement Performance.
Interim rept. 1982-83,
C. G. Bell, S. D. Tayabji, and P. A. Okamoto. Oct 83, 47p FHWA/MN/RD-83/06
Also pub. as Minnesota Dept. of Transportation, St. Paul Investigation no. 209.

A field program of strain and deflection measurements was conducted. The objective of the program was to evaluate the effect of frozen support, tied-concrete shoulder, and tridem-axle loading on concrete pavement performance. Results of the study on the effect of frozen support are presented in this paper.

513,735

PB85-135796/GAR PC A03/MF A01
Federal Highway Administration, Washington, DC. Office of Implementation.
Guidelines for Making Pedestrian Crossing Structures Accessible.
R. A. Richter, and C. L. King. Aug 84, 34p FHWA/IP-84/6

In designing and locating pedestrian over- and undercrossing structures, accessibility for handicapped persons is an important consideration. Features needed to provide accessibility should be incorporated into the structures unless it is shown that it is impractical to do so. Even when full accessibility is not provided, as many of the handicapped population as possible should be accommodated on the pedestrian structure. The types of features used most commonly on over- and undercrossing structures are determined by the needs of two major groups of handicapped users -- those who use wheelchairs and those who are visually impaired. Completed research provides an indication of the accessibility requirements of handicapped persons who use wheelchairs or are visually impaired. The maximum ramp grades and distances between resting places needed by persons in wheelchairs are provided. Design requirements necessary to accommodate persons with other types of ambulatory disabilities are also described. Features necessary to accommodate both persons with limited vision and those who cannot see at all are detailed.

513,736

PB85-136356/GAR PC A05/MF A01
Agency for International Development, Washington, DC.
Suggestions for a Regional Watershed Management Project.
P. A. Dulin. 20 Sep 82, 98p AID-PN-AAL-772

Two consultants were hired to assess country needs and capabilities in preparation for a proposed A.I.D. regional water management project in Central America. The result of the consultancy in Costa Rica, Nicaragua, and Panama is herein presented. After exemplifying the importance of watershed management in the region through reviews of water use and the extent of watershed degradation in the three countries, the author provides brief profiles of Costa Rican, Panamanian, and Nicaraguan government institutions involved in water use/management.

513,737

PB85-136695/GAR PC A02/MF A01
Centro Agronomico Tropical de Investigacion y Ensenanza, Turrialba (Costa Rica).
Natural Resource Inventories in Developing Countries: The Case of Central America.
P. A. Dulin. 1982, 18p AID-PN-AAL-800

Accurate information is paramount in planning for the rational development and allocation of natural resources in developing countries. This paper discusses the past and present lack of such information in Central America and the history of natural resource inventories in the region. Resource exploitation is examined in terms of inherent socioeconomic pressures, poverty, government policy, and the energy crisis.

513,738

PB85-136869/GAR PC A05/MF A01
Resource International, Inc., Columbus, OH.
Manual of Operation and Use of Dynaflect for Pavement Evaluation.
K. Majidzadeh, and V. Kumar. Oct 83, 76p FHWA/OH-83/004
Sponsored by Ohio Dept. of Transportation, Columbus.

This manual was developed to provide assistance in the interpretation of dynamic deflection measurements obtained with the Dynaflect trailer and guidelines for the design of pavement overlays utilizing these data. Discussions relating to the significance of the individual deflection readings and mathematical parameters derived from these deflections are also included. Figures are presented, along with example problems, which demonstrate a graphical procedure for the design of overlay thicknesses for various types of pavement. The manual describes how Dynaflect data are collected and processed in Ohio with sample computer output and plots shown. Operating instructions and field-oriented troubleshooting hints for the Dynaflect are also included.

513,739
PB85-137032/GAR PC **A08**/MF **A01**
TRC Environmental Consultants, Inc., East Hartford, CT.
Determination of Fugitive Coal Dust Emissions from Rotary Railcar Dumping. Volume 1,
E. T. Brookman, D. H. Carnes, P. A. Catizone, and K. J. Kelley. Sep 84, 166p PPSP/PPSE/T-33-VOL-1
See also PB85-137040.

TRC Environmental Consultants, Inc. conducted 72 field tests to determine particulate emission levels for a rotary railcar coal dumper operated by the Potomac Electric Power Company. Approximately 60 parameters were monitored as part of the testing program. These parameters related to particulate emissions, meteorology, and coal properties. The railcar dumper was situated inside of a shed. No other control devices were in operation during the test program. Emissions were measured at the entrance and exit doorways of the shed using the mass flux technique. Background levels were accounted for using the upwind/downwind technique. The amount of particulate material that deposited within the shed was also recorded. The study resulted in the determination of emission levels that were one to two orders of magnitude less than those cited in the literature. These emission levels were found to correlate the strongest with the moisture content of the coal and whether the coal was washed or unwashed.

513,740
PB85-137040/GAR PC **A12**/MF **A01**
TRC Environmental Consultants, Inc., East Hartford, CT.
Determination of Fugitive Coal Dust Emissions from Rotary Railcar Dumping. Volume 2. Appendices A-H,
E. T. Brookman, D. H. Carnes, P. A. Catizone, and K. J. Kelley. Sep 84, 261p PPSP/PPSE/T-33-VOL-2
See also PB85-137032.

TRC Environmental Consultants, Inc. conducted 72 field tests to determine particulate emission levels for a rotary railcar coal dumper operated by the Potomac Electric Power Company. Approximately 60 parameters were monitored as part of the testing program. These parameters related to particulate emissions, meteorology, and coal properties. The railcar dumper was situated inside of a shed. No other control devices were in operation during the test program. Emissions were measured at the entrance and exit doorways of the shed using the mass flux technique. Background levels were accounted for using the upwind/downwind technique. The amount of particulate material that deposited within the shed was also recorded. The study resulted in the determination of emission levels that were one to two orders of magnitude less than those cited in the literature. These emission levels were found to correlate the strongest with the moisture content of the coal and whether the coal was washed or unwashed.

513,741
PB85-137057/GAR PC **A08**/MF **A01**
Resource International, Inc., Columbus, OH.
Establishment of a Pavement Management Information and Feedback System.
Final rept. on Phase 1,
K. Majidzadeh. Nov 83, 152p FHWA/OH-84/002
Sponsored by Ohio Dept. of Transportation, Columbus.

The purpose of a Pavement Management System, (PMS) is to achieve the best possible value for the available public funds and to provide safe, comfortable, and economic transportation. PMS encompasses a wide range of activities including planning, design, construction, maintenance and the periodic evaluation of performance. In this report, the elements of a PMS and its interrelationship is introduced together with benefits gained by adopting such systems. Discussions and recommendations for establishing a data bank are outlined. A summary of PMS activities currently in use by several states including Texas, California, Washington and Arizona, as well as Ohio is presented. A PMS data bank is proposed to be adopted by ODOT that utilizes most of the pavement data already existing in the ODOT computerized files.

513,742
PB85-137065/GAR PC **A06**/MF **A01**
Kentucky Univ., Lexington. Inst. for Mining and Minerals Research.
Proceedings of Kentucky Coal By-Products Symposium (8th) Held at Lexington, Kentucky on September 12-14, 1982. Enhanced Energy and Coal Recovery from Preparation Facilities and Disposal Sites,
J. G. Rose, and A. E. Bland. c1983, 119p IMMR82-074, ISBN-0-86607-012-5
See also PB85-114494. Sponsored by Kentucky Energy Cabinet, Lexington.

This document contains the proceedings of the 8th Kentucky Coal By-Products Symposium. The topic was 'Enhanced Energy and Coal Recovery from Preparation Facilities and Disposal Sites.' The enhanced recovery of energy from coal preparation facilities and disposal sites has become the focus of renewed interest by both government and private industry. Many new technologies are emerging which center upon the recovery of saleable coal, enhanced coal recovery systems within present preparation facilities, and energy recovery via the emerging fluid bed combustion systems. It was the expressed purpose of this symposium to present the state-of-the-art in enhanced energy recovery systems for coal preparation facilities and exchange technical information to encourage the commercial development of these technologies. The symposium consisted of three sessions focusing on Atmospheric Fluid Bed Combustion of Coal Refuse, Saleable Coal Recovery from Coal Refuse, and Advances in Conventional Coal Recovery. A total of 16 papers covering various aspects of these topics were presented.

513,743
PB85-137156/GAR PC **A06**/MF **A01**
Nevada Univ. System, Reno. Desert Research Inst.
Investigation of Electrical Properties of Porous Media,
S. W. Wheatcraft, K. C. Taylor, and J. G. Haggard. Dec 84, 117p EPA/600/4-84/089

The problem of ground water contamination has provided a need for detailed information on ground water quality. Well drilling and sampling provide limited information, especially when trying to delineate a ground water contamination plume. D.C. electrical geophysical methods are being increasingly used to help delineate contaminated ground water, however, these methods provide only resistivity data. Simple resistivity is affected by many different parameters (such as pore geometry, pore fluid chemistry and clay content) and it is often not possible to develop a unique interpretation of the data. Complex resistivity (CR) is a method that provides considerably more information about the saturated porous medium, thus introducing the possibility of reducing the unknown parameters that affect the electrical properties of the porous medium and thereby providing a unique interpretation.

513,744
PB85-137172/GAR PC **A03**/MF **A01**
Texas Univ. at Austin. Center for Transportation Research.
Asphalt Concrete Overlay Design Considerations.
Research rept. (Final),
F. L. Roberts, and T. W. Kennedy. Feb 84, 37p CTR-3-9-82-318-1F, FHWA/TX-84/13+318-1F
Sponsored by Texas State Dept. of Highways and Public Transportation, Austin.

This report contains the results of a literature survey and small computer study using the ELSYM 5 computer program to investigate the state of stresses and strains in asphalt mixtures used as overlays as compared to those used in conventional pavement layers.

513,745
PB85-137180/GAR PC **A06**/MF **A01**
Texas Transportation Inst., College Station.
Model to Calculate the Road User Costs at Work Zones.
Interim rept. Sep 81-Sep 82,
J. L. Memmott, and C. L. Dudek. Sep 82, 123p TTI-2-18-81-292-1, FHWA/TX-83/20+292-1
Sponsored by Texas State Dept. of Highways and Public Transportation, Austin.

This report presents a model, QUEWZ, which can be used to calculate the user costs resulting from lane closures through a work zone. QUEWZ calculates the delay costs and speed-change cycling costs of slowing down to go through a work zone and the change in vehicle running costs through the work zone. The model can examine a variety of lane closure strategies, which fall into two general categories; lane closures in a single direction of travel, and crossovers, where one or more lanes are closed in both directions of travel.

513,746
PB85-137230/GAR PC **A10**/MF **A01**
Resource International, Inc., Worthington, OH.
Evaluation of Rigid Pavement Overlay Design Procedures.
Final rept. Oct 78-Jun 81,
K. Majidzadeh, and G. J. Ilves. Dec 83, 204p FHWA/RD-83/090
Contract DOT-FH-11-9489
See also PB82-136672.

A review and evaluation of existing rigid pavement overlay design procedures, including the ARE procedure (DOT-FH-11-8544) resulted in a fully computerized rational method for the design of overlays for rigid pavements. The thickness of overlay is determined from the consideration of protecting the surface layer from fatigue failure while allowing lower layers (old pavement, bondbreaker layer) to fail during the design life. The progressive failure concept results in thinner overlays than would be derived from previous concepts of preventing further fatigue damage to the existing pavement. Stress analysis is done using elastic layer theory with edge and corner load adjustment factors developed using a plate on multilayer elastic solid foundation program, consequently program execution is very fast. The OAR procedure has been applied to several pavements in different parts of the U.S. with excellent correlation in performance prediction.

513,747
PB85-137321/GAR PC **A06**/MF **A01**
Arizona Univ., Tucson. Office of Arid Lands Studies.
Draft Environmental Profile on Guyana,
S. L. Hilty. Apr 82, 123p AID-PN-AAL-841
Contract NPS-CX-0001-0-0003
Sponsored by National Committee for Man and the Biosphere, Washington, DC.

Guyana, with exceptionally rich natural resources, most of which remain unexploited, is in the unique position of being able to take steps to manage its resources before environmental degradation occurs. Derived from information available in the United States, this draft report profiles Guyana's environmental resources and reviews the impact of the development process upon those resources. Covered in turn are the country's geographic features; climate; population, including cultural and demographic considerations; land use; soil, mineral, water, and electrical power resources; and flora and fauna. Guyana's major environmental problems are confined to the coastal areas.

513,748
PB85-137362/GAR PC **A11**/MF **A01**
Systems Applications, Inc., San Rafael, CA.
Continued Research in Mesoscale Air Pollution Simulation Modeling. Volume 5. Refinements in Numerical Analysis, Transport, Chemistry, and Pollutant Removal.
Final rept. Oct 79-Jul 82,
J. P. Killus, J. P. Meyer, D. R. Durran, G. E. Anderson, and T. N. Jerskey. Dec 84, 238p EPA/600/3-84/095A
Contract EPA-68-02-2216
See also PB-257 529, and PB85-137370.Portions of this document are not fully legible.

Two numerical integration methods identified as having features that provided significant improvements over the technique originally embedded in the Airshed Model have been evaluated. Of particular concern was the treatment of horizontal transport. In the evaluation of the schemes, the predictions resulting

from the SHASTA method differed no more than about 20 percent from those generated using the original method. In addition, SHASTA possesses the better blend of computational speed and minimum error propagation. An objective analysis technique for obtaining a gridded, time-varying, fully three-dimensional wind field for the Airshed Model from available measurements has been developed. The technique accounts for urban heat island effects and should be directly applicable to relatively flat areas. A 42-step chemical kinetic mechanism for describing the chemical transformations of organics, NOx, O3, and SO2 and the production of sulfate, nitrate, and organic aerosols is presented. A unique feature of this mechanism is the explicit consideration given to the carbon bonds making up each organic molecule. An algorithm that relates the effective deposition velocity to the stability of the atmosphere and the type of surface has been implemented in the Airshed Model. Surface removal processes may significantly affect the concentrations of O3, NO2, and SO2.

513,749
PB85-137370/GAR PC A14/MF A01
Systems Applications, Inc., San Rafael, CA.
Continued Research in Mesoscale Air Pollution Simulation Modeling. Volume 6. Further Studies in the Modeling of Microscale Phenomena.
Final rept. Oct 79-Jul 82,
R. G. Lamb, D. R. Durran, L. E. Reid, W. R. Shu, and J. H. Seinfeld. Dec 84, 307p EPA/600/3-84/095B
Contract EPA-68-02-2216
See also PB85-137362, and PB85-137388. Prepared in cooperation with California Inst. of Tech., Pasadena.

This report describes the development of techniques for modeling the microscale phenomena associated with urban air pollution. Such phenomena include turbulent diffusion, turbulent concentration fluctuations, and sub-grid scale variations in the time averaged concentration field. Optimal eddy diffusivities were reexamined to determine whether (1) the diffusivities are unique, (2) they have a universal form when properly scaled, and (3) they are dependent on source height. A model for describing the effects of turbulent concentration fluctuations on second-order chemical reactions has also been developed and tested. It was applied to the case of NO emanating from a point source into an O3 laden atmosphere. Results showed that the rate of conversion of NO to NO2 is greatly inhibited by turbulent concentration fluctuations, even under stable conditions. A method of paramaterizing the effects of chemical reaction rates of both subgrid-scale concentration variations arising from ground-level sources and turbulence-induced concentration fluctuations has also been developed. In addition, theoretical frameworks for two models of pollutant levels around roadways are introduced.

513,750
PB85-137388/GAR PC A10/MF A01
Systems Applications, Inc., San Rafael, CA.
Continued Research in Mesoscale Air Pollution Simulation Modeling. Volume 7. Mathematical Modeling of Urban Aerosol Dynamics.
Final rept. Oct 79-Jul 82,
T. N. Jerskey, L. E. Reid, J. H. Seinfeld, and F. Gelbard. Dec 84, 203p EPA/600/3-84/095C
Contract EPA-68-02-2216
See also PB85-137370. Prepared in cooperation with California Inst. of Tech., Pasadena.

A simplified model of the dynamics of photochemical aerosols is developed, and initial applications are presented. The model, which can be incorporated in or coupled to a photochemical air quality simulation model, takes into consideration the emissions of particles with diameters of 0.01 to 1.0 micrometer and their growth in this size range by the formation of secondary aerosol. The formation of particulate matter is assumed to occur in two stages--condensable material first forms in the gas phase and then diffuses to the particles. A pseudo-steady-state is assumed in which the rate of formation of condensable material in the gas phase is set equal to the rate at which condensation occurs on particles. Model simulations are presented for a batch system both with and without sources of primary aerosol and for a trajectory system. Model simulations and smog chamber experiments are in qualitative agreement.

513,751
PB85-137594/GAR PC A03/MF A01
General Accounting Office, Washington, DC. Resources Community and Economic Development Div.
Department of Energy Acting to Control Hazardous Wastes at its Savannah River Nuclear Facilities.
21 Nov 84, 50p GAO/RCED-85-23, B-216332

Since the Department of Energy's (DOE's) discovery in 1981 that the groundwater beneath the fuel fabrication facility at its Savannah River Plant was contaminated with nonradioactive hazardous wastes, DOE has taken several steps to clean up the problem and to prevent future environmental damage. There is no evidence that contaminants from small amounts of wastes reaching the deep Tuscaloosa Aquifer--a source of drinking water for much of the Southeast--have migrated offsite. DOE has implemented a 20-year plan to remove the wastes from the upper level groundwater. It has also begun to identify and monitor other waste disposal sites within the plant's boundaries and has developed an environmental action plan that prioritizes work necessary to prevent future problems. In addition, DOE has entered into formal agreements with the Environmental Protection Agency and the state of South Carolina to increase coordination on nonradioactive waste disposal matters at the Savannah River Plant.

513,752
PB85-138089/GAR PC A12/MF A01
Massachusetts Univ., Amherst. Water Resources Research Center.
Regional Assessment of Wetlands Regulation Programs in New England.
Final rept.
Sep 82, 259p
See also PB84-175918. Sponsored by Office of Technology Assessment, Washington, DC.

This report is one of ten regional case studies prepared for OTA for use in its study: Wetlands: Their use and regulation. The study identifies wetland trends, use factors and institutional structures before and after Federal and State legislation aimed at preserving and protecting wetlands were passed.

513,753
PB85-138188/GAR PC A02/MF A01
Environmental Protection Agency, Cincinnati, OH. Hazardous Waste Engineering Research Lab.
Hazardous Waste Incinerator Performance Evaluations by the United States Environmental Protection Agency,
D. A. Oberacker. Dec 84, 12p EPA/600/D-84-285

This paper provides a summary of performance information gained from hazardous waste incineration testing supported by USEPA. The data and results presented focus on twelve (12) environmental performance evaluations conducted on industrial and commercial waste incinerators from 1974-1984. Specific installations tested included liquid injection units, rotary kiln-plus-afterburner furnaces, controlled air units, and the Vulcanus ships which utilize large, unscrubbed liquid injection units. Pumpable liquids, gases, bulk solids, and containized solid-liquid materials were studied. Some units were 'off-site commercial' waste disposal facilities, while others were 'on-site, dedicated' units used for process waste streams or dedicated research installations. These results have shown that well-designed and operated incinerators of typical sizes incinerating a wide variety of organic chemical wastes are capable of meeting current regulatory requirements with some exceptions. Most units investigated were successful in meeting the waste destruction and removal (DRE) requirement, while other requirements such as acid gas (HCl) control and particulate control were occasionally not met with some of the lower technology pollution control systems.

513,754
PB85-138295/GAR PC A07/MF A01
JACA Corp., Fort Washington, PA.
Case Study of New Jersey Wetlands: Trends and Factors Influencing Wetland Use.
Final rept.
3 Sep 82, 146p
See also PB84-175918. Sponsored by Office of Technology Assessment, Washington, DC.

This report is a case study of the management of wetlands in the State of New Jersey in recent years. The study identifies wetland trends, wetland use factors and institutional structures before and after Federal and state legislation aimed at preserving and protecting wetlands were passed. The objective is to indicate the effectiveness of present legislation, any overlaps or gaps in the programs, and any specific recommendations for change at the Federal level.

513,755
PB85-138428/GAR PC E05/MF E05
Transport and Road Research Lab., Crowthorne (England).
Structural Design of Bituminous Roads.
Laboratory rept.,
W. D. Powell, J. F. Potter, H. C. Mayhew, and M. E. Nunn. c1984, 70p TRRL/LR-1132

Since the 3rd edition of Road Note 29 was published in 1970, further information on road performance has been obtained and there have been important advances in research on materials, methods of construction and mathematical models of pavement behavior. These advances have been used to develop a new method for the structural design of road pavements. It is based on the performance of experimental roads interpreted in the light of structural theory. The capping layer and sub-base is designed primarily as a construction platform. Design curves are given for the thickness of bituminous, lean concrete or wet-mix roadbase required to carry the traffic expected to use the road during its design life. The design method offers the means of adapting proven designs to take advantage of new materials, new design configurations and construction methods. (Copyright (c) Crown Copyright 1984.)

513,756
PB85-138535/GAR PC A05/MF A01
Midwest Research Inst., Kansas City, MO.
Thermal Degradation Products from Dielectric Fluids.
Interim rept. no. 1,
M. D. Erickson, C. J. Cole, J. D. Flora, P. G. Gorman, and C. L. Haile. 19 Nov 84, 100p EPA/560/5-84/009
Contract EPA-68-02-3938

Electrical transformer fires can cause extensive smoke damage, especially when polychlorinated biphenyls (PCBs) are involved since they can form polychlorinated dibenzofurans (PCDFs) and other toxic by-products. To characterize the potential for by-product formation, this study was undertaken to optimize conditions for PCDF formation from PCBs and to study the potential for formation of PCDFs and polychlorinated dibenzodioxins (PCDDs) from combustion of selected dielectric fluids, including those contaminated with PCBs. A bench-scale thermal destruction system was used to combust the samples. The dielectric fluid was fed continuously using a syringe pump. The concentrations of CO, CO2, and O2 in the effluent were monitored continuously. The entire effluent from the thermal destruction system was passed through an XAD-2 trap to collect PCDFs and other semivolatile organics. The XAD-2 trap and a rinse of connective tubing were Soxhlet extracted. Extracts were cleaned using column chromatography to isolate the PCDFs and PCDDs. All samples were analyzed for PCDFs using HRGC/EIMS in the selected ion monitoring mode. The results of this work indicate that the optimum conditions for PCDF formation from PCBs are near 675C for 0.8 s or longer, with 8% excess oxygen. Under these conditions, percent levels of PCDFs are formed from mineral oil or silicone oil contaminated with PCBs at 5ppm or greater. PcDFs and PCDDs are also formed from a trichlorobenzene dielectric fluid which contained no detectable PCBs.

513,757
PB85-138543/GAR PC A04/MF A01
Shapiro and Associates, Inc., Seattle, WA.
Analysis of Wetlands Regulation and the Corps of Engineers' Section 404 Program in Western Washington,
M. E. Boule. 14 Sep 82, 69p
See also PB84-175918.

This report is one of ten regional case studies prepared for OTA for use in its study: Wetlands: Their use and regulation. The study identifies wetland trends, use factors and institutional structures before and after Federal and State legislation aimed at preserving and protecting wetlands were passed.

513,758
PB85-138600/GAR PC A03/MF A01
Environmental Monitoring Systems Lab., Las Vegas, NV.

User's Guide for the Computer Program Response Factor (REFAC).
Rept. for Jul 83-Sep 84,
M. C. Bates, and G. G. Hansen. Nov 84, 43p EPA/600/8-84/028

This manual describes REFAC to the user and demonstrates how to run the program. A description of the INITIALIZATION and ONGOING process is given in Section 2 along with the formulas used to calculate relevant statistics. Section 3 describes the running of REFAC, provides a command list, and also gives examples of REFAC generated output for both ONGOING and INITIALIZATION processes. REFAC variables and data structures are presented along with the source listing in Section 4.

513,759

PB85-138634/GAR PC **A05**/MF **A01**
WWI Consulting Engineers, Emeryville, CA.
Technology Assessment of Carver-Greenfield Municipal Sludge Drying Process.
Final rept. Apr 81-Apr 83,
H. C. Hyde. Dec 84, 77p EPA/600/2-84/200
Contract EPA-68-03-3016

This project provided a technology assessment of a promising alternative for drying municipal wastewater sludge. Evaluated was the Carver-Greenfield (C-G) process which uses the principle of multiple effect evaporation. The process can dry aqueous solutions or slurries with a wide range of solids content (4-45%). The unique characteristic of the process is the addition of a carrier oil which maintains viscosities at a low enough level to facilitate pumping and heat transfer when the solids content becomes higher as water is evaporated. The process has been used primarily in the food, pharmaceutical, and industrial wastewater treatment industries and has seen limited application for municipal sludge drying. The only municipal application in this country is now under construction for the City of Los Angeles Hyperion Energy Recovery System (HERS) project. The process appears energy and cost effective.

513,760

PB85-138667/GAR PC **A19**/MF **A01**
Environmental Protection Agency, Seattle, WA. Region X.
Final Environmental Impact State, Red Dog Mine Project, Northwest Alaska.
Sep 84, 431p EPA/910/9-84/122A
See also PB85-138675 and PB84-171677. Prepared in cooperation with Department of Interior, Washington, DC.

Actions to be considered are the approvals of permits for the proposed Red Dog Mine Project in northwestern Alaska. A transportation corridor would be constructed from the mine to a port site on the Chukchi Sea. Impacts of the proposed project are described as they relate to vegetation and wetlands, wildlife, water quality, fishery resources, physical and chemical oceanography, air quality, visual resources, cultural resources, subsistence, socioeconomics, recreation, cost and Cape Krusenstern National Monument.

513,761

PB85-138675/GAR PC **A15**/MF **A01**
Environmental Protection Agency, Seattle, WA. Region X.
Final Environmental Impact Statement, Red Dog Mine Project, Northwest Alaska. Volume 2. Appendices.
Sep 84, 334p EPA/910/9-84/122B
See also PB85-138667. Prepared in cooperation with Department of Interior, Washington, DC.

Appendices to EPA 910/9-84-122a: Red Dog Mine Project Final Environmental Impact Statement are described in the report. Included in the study are: Reclamation plan; Spill prevention and control; Biological assessment; Permits; Cultural resources protection; and Coastal zone management.

513,762

PB85-138899/GAR PC **A04**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Isolation and Concentration of Organic Substances from Water: An Evaluation of Supercritical Fluid Extraction,
D. J. Ehntholt, C. P. Eppig, and K. E. Thron. Nov 84, 68p EPA/600/1-84/028
Contract EPA-68-03-3001

This study describes the use of supercritical fluid carbon dioxide (SCF CO2), as an extraction solvent, for the isolation and concentration of twenty-three specified organic solutes in water at trace levels. This type of direct extraction using a non-toxic, non-hazardous solvent such as carbon dioxide represents a new concept for the isolation and concentration of organic compounds from water. The ability of SCF CO2 system to extract and subsequently trap model solutes, with widely varying chemical and physical properties, was generally found to be lacking. Only four of the model solutes (2,4-dichlorophenol, isophorone, phenanthrene and stearic acid) demonstrated recovery values of greater than 40 percent. The low recoveries were to an inefficient trap system, adsorption, and the inability of supercritical fluid CO2 to extract highly water soluble or alkaline solutes.

513,763

PB85-138956/GAR PC **A03**/MF **A01**
Rauhut (Brent) Engineering, Inc., Austin, TX.
Pavement Damage Functions for Cost Allocation: Executive Summary.
Rept. for 29 Sep 80-20 Jun 84,
J. B. Rauhut, R. L. Lytton, and M. I. Darter. Jun 84, 40p FHWA/RD-84/017
Contract DTFH61-80-C-00175
See also Volume 1, PB85-138964.
Also available in set of 4 reports PC E99, PB85-138949.

Pavement damage functions were developed for both flexible and rigid pavement distresses that were considered significant as generators of major repair or rehabilitation. These damage functions were then used to develop load equivalence factors for each of these significant distresses. The result of this is a family of damage functions or distress models for broad application for pavement management and other uses as well as for cost allocations. A computer program called program DAMAGE was developed to use these damage functions in the calculation of load equivalence factors, and the distribution of the various types of damage to specific axle load classes. This Executive Summary briefly describes the study and its results.

513,764

PB85-138964/GAR PC **A14**/MF **A01**
Rauhut (Brent) Engineering, Inc., Austin, TX.
Pavement Damage Functions for Cost Allocation. Volume 1. Damage Functions and Load Equivalence Factors.
Final rept. 29 Sep 80-20 Jun 84,
J. B. Rauhut, R. L. Lytton, and M. I. Darter. Jun 84, 314p FHWA/RD-84/018
Contract DTFH61-80-C-00175
See also Volume 2, PB85-138972, and PB85-138956. Also available in set of 4 reports PC E99, PB85-138949.

The broad objectives defined for this project were (1) To compare damage predicted by existing pavement damage models with the damage that has actually occurred on selected test sections of highways, (2) To modify the damage functions and other aspects of the models to more closely match the observed damage, and (3) To provide a procedure that can be used to evaluate the costs of pavement damage as a function of vehicle class, using the modified models.

513,765

PB85-138972/GAR PC **A11**/MF **A01**
Rauhut (Brent) Engineering, Inc., Austin, TX.
Pavement Damage Functions for Cost Allocation. Volume 2. Descriptions of Detailed Studies.
Final rept. 29 Sep 80-20 Jun 84,
J. B. Rauhut, R. L. Lytton, and M. I. Darter. Jun 84, 232p FHWA/RD-84/019
Contract DTFH61-80-C-00175
See also Volume 3, PB85-138980, and Volume 1, PB85-138964.
Also available in set of 4 reports PC E99, PB85-138949.

Pavement damage functions were developed for both flexible and rigid pavement distresses that were considered significant as generators of major repair or rehabilitation. Volume 2 reports the results of laboratory testing of material samples from flexible pavement test sections in New York, Texas, Florida, Louisiana and Colorado, and the characterization of material properties for the VESYS III-B flexible pavement model. The testing included repetitive load testing and indirect tensile tests, as well as conventional material testing. The materials characterizations included fatigue life potential for asphalt concrete, stiffnesses of the component layers of the pavement structure, and permanent deformation potential for the component layers.

513,766

PB85-138980/GAR PC **A09**/MF **A01**
Rauhut (Brent) Engineering, Inc., Austin, TX.
Pavement Damage Functions for Cost Allocation. Volume 3. Flexible Pavement Damage Functions Developed from AASHO Road Test Data.
Final rept. 29 Sep 80-20 Jun 84,
J. B. Rauhut, and P. Jordahl. Jun 84, 186p FHWA/RD-84/020
Contract DTFH61-80-C-00175
See also Volume 2, PB85-138972.
Also available in set of 4 reports PC E99, PB85-138949.

Flexible pavement damage functions for rutting and serviceability loss were developed from a representative subset of AASHO Road Test data consisting of 76 test sections. The primary purpose of this limited project was to check out and validate the use of a combined mechanistic and empirical modeling approach to develop damage functions that were used in the recent cost allocations studies. Load equivalence factors were also developed from the damage functions and compared to other LEF's from previous studies.

513,767

PB85-139020/GAR PC **A19**/MF **A01**
National Marine Pollution Program Office, Rockville, MD.
National Marine Pollution Program: Catalog of Federal Projects.
Jul 82, 450p
Appendix no. 2 to PB82-218462. See also PB85-139004, and PB85-139012. Prepared in cooperation with Interagency Committee on Ocean Pollution Research, Development, and Monitoring, Washington, DC.

The Catalog of Federal Projects, is a primary supporting document for the National Marine Pollution Program Plan FY 1981 - FY 1985. The Catalog presents summaries of about 1000 projects in nearly 100 programs funded by the eleven Federal departments and independent agencies involved in the National Marine Pollution Program. Projects included in the Catalog are limited to efforts that focus primarily on pollution problems in the oceans and Great Lakes.

513,768

PB85-139244/GAR PC **E03**/MF **E03**
Oxford Univ. (England). Transport Studies Unit.
Trade-Offs for Urban Bus Operators in Planning Passenger Information Systems: Background to a New Research Project.
M. C. Dix, and R. P. McKenzie. 1984, 15p TSU/REF-266
Presented at the Joint BCC/UTSG Seminar held at Wadham College, Oxford, England, September 1984.

The short paper introduces a research project of passenger travel information systems designed to inform the travelling public of current, advertized services; to advise passengers of delays, or day-to-day departures from advertized services; and to accompany the occasional - though in recent years, increasingly frequent - fare and network revisions and reorganizations.

513,769

PB85-139285/GAR PC **E06**/MF **E06**
Open Univ., Milton Keynes (England). Energy Research Group.
Milton Keynes Energy Park: Wind Study,
T. Oreszczyn, and B. Jones. Jun 84, 103p ERG-049

Milton Keynes Development Corporation (MKDC) are planning to develop two square miles of land to the west of Milton Keynes as a residential and industrial area with energy as a theme, called the Energy Park. Energy is both input and output to the site through the climate. The local climate (microclimate) will therefore alter the energy demand and thermal comfort of the

site. The wind is the most controllable climatic parameter and effects domestic energy consumption and human comfort. Shelterbelts can reduce the local wind speed and so reduce both the energy consumption and comfort within an estate. This report examines the wind field across the Energy Park site before development work started and also the wind field in Milton Keynes. It also examines the potential for shelterbelts - their design and optimum siting.

513,770
PB85-139343/GAR PC **E05**/MF **E05**
Transport and Road Research Lab., Crowthorne (England).
Deregulation of Bus Services in the Trial Areas 1981-84.
Laboratory rept.,
R. D. Fairhead, and R. J. Balcombe. c1984, 51p
TRRL/LR-1131

Trial Areas, where stage carriage bus services were deregulated, were designated in parts of Norfolk, Hereford and Worcester, and Devon, following the Transport Act 1980. All three areas were mainly rural, Hereford being the largest town in any of them. Hereford and Worcester County Council adopted a new revenue support policy, awarding contracts for subsidized bus services by competitive tender. This resulted in a transfer of services between operators, with a substantial saving in total revenue support, but little overall change in the rural bus network. There was considerable competition between unsubsidized services, mainly in Hereford but also on some inter-urban routes, with dramatic fare reductions, frequency increases and continual service changes. In the other counties revenue support policies were unaltered, and councils looked to operators to take initiatives in developing new services. The resulting changes in Norfolk and Devon were on a very small scale, and insufficient to prevent a slow overall rate of decline in rural bus services. In itself, deregulation of bus services appears to have had little effect in rural areas, but it has led to lower fares and more frequent services in the town of Hereford and on some inter-urban routes. This competition appears to be unstable, and it is not yet clear what its long-term effects may be. (Copyright (c) Crown Copyright 1984.)

513,771
PB85-139368/GAR PC **E05**/MF **E05**
Transport and Road Research Lab., Crowthorne (England).
Estimation of Annual Flow from Short Period Traffic Counts.
Supplementary rept.,
G. Phillips, P. Blake, and D. Reeson. c1984, 60p
TRRL/SR-802

Short period manual counts of less than twenty-four hours duration are commonly used to measure traffic flow at particular sites. In a previous report, SR 514, the accuracy of the estimates of total annual flow from a single short period count was examined. Recommendations were given for the most appropriate length and timing of these counts. In this report, the previous work has been extended to cover the estimation of flow for individual vehicle categories. In addition, the value of mounting two counts, one in August and one in a neutral month, has been investigated. Recommendations are given for the appropriate timing of counts and methods of estimation. (Copyright (c) Crown Copyright 1984.)

513,772
PB85-139483/GAR PC **E03**/MF **E03**
Warren Spring Lab., Stevenage (England).
Incineration of Municipal Refuse.
Rept. for 1974-84,
P. Clayton. c1984, 24p ISBN-0-85624-352-3, LR-498(AP)-M

Warren Spring Laboratory has been involved in the measurement of emissions from municipal incinerators for the past decade. The work was carried out mainly at the request of the Department of the Environment. Measurements were made at eight incinerators in the United Kingdom to collect data on the emissions to atmosphere of a range of pollutants, including total particles, sulphur dioxide, hydrogen chloride, heavy metals and polynuclear aromatic hydrocarbons. In addition, the fate of heavy metals, cadmium in particular, was examined. The distribution of heavy metals in the incineration system was variable but only small percentages of lead (up to 5%) and cadmium (up to 29%) were emitted. Most of the lead (60% to 90%) remained in the clinker, the remainder being collected by the electrostatic precipitator.

513,773
PB85-139673/GAR PC **E03**/MF **E03**
Transport and Road Research Lab., Crowthorne (England).
Accessibility and Public Transport Use.
Supplementary rept.,
S. R. Jones. c1984, 24p TRRL/SR-832

Accessibility is concerned with the opportunity available to people to reach activities that are important or of interest to them. This report investigates the relationship between accessibility and travel behavior. Using data from Tyne and Wear it considers the particular case of accessibility by and use of public transport in a large urban area. It finds that, for one car households, there is no evidence of accessibility by public transport affecting public transport use. For carless households, in contrast, it finds evidence to suggest that overall public transport trip rates could vary due to accessibility by roughly 20 per cent between areas within the same conurbation. The results are not conclusive but they do add weight to the idea that variations in accessibility by public transport between different parts of an urban area may possibly produce significant differences in some aspects of public transport travel behavior. (Copyright (c) Crown Copyright 1984.)

513,774
PB85-139806/GAR PC **E04**/MF **E04**
Warren Spring Lab., Stevenage (England).
Dispersion Model for Deposition of Particulate Material from Straw and Stubble Burning.
A. M. Spanton, A. Wilkinson, and G. McInnes. c1984, 43p ISBN-0-85624-351-5, LR-497(AP)-M

Measurements collected during observations of straw and stubble burning in 1982 indicated the need for further investigations into the effect of the burn procedure on the production of air pollutants, their emission and deposition. This report presents details of practical work quantifying the settling velocity of the particles, defines the meteorological conditions most likely to occur during the burning period, and presents the results obtained from a 'tilted-plume' Gaussian dispersion model applied to the problem. An attempt is also made to correlate modelled depositions with those obtained in 1982. (Copyright (c) Crown Copyright, September 1984.)

513,775
PB85-139814/GAR PC **E04**/MF **E04**
Warren Spring Lab., Stevenage (England).
Shipboard Spraying Equipment for Undiluted Dispersant Concentrates.
Rept. for Sep 82-Mar 84,
S. Crowley. c1984, 29p ISBN-0-85624-346-9, LR-492(OP)-M

This report discusses the requirements of shipboard spray equipment for the application of undiluted concentrates (Type 3 dispersants) and describes the tests carried out to assess the performance of commercially available equipment in relation to these requirements.

513,776
PB85-139822/GAR PC **E04**/MF **E04**
Warren Spring Lab., Stevenage (England).
Combustion of Waste Derived Fuel.
Rept. for 1976-84,
B. J. Davis, and P. Clayton. c1984, 29p ISBN-0-85624-345-0, LR-491(AP)-M

Over the past decade Warren Spring Laboratory has been involved in programs to investigate various aspects of the incineration of waste and the use of Refuse Derived Fuel (RDF). Investigations were carried out to assess the suitability of RDF for combustion in various types of boiler system and to measure the emissions of gaseous and particulate pollutants. All the systems tested were originally designed for the combustion of coal and, unless suitable modifications have been made, pelletised RDF proves to be a more suitable fuel than shredded RDF. The amount of ash produced by the combustion of RDF or RDF/coal mixtures is greater than for coal alone. In addition, ash fusion temperatures are lower, leading to increased clinker formation which, on fixed grate boilers, can be a serious problem. With manual systems de-ashing is necessarily carried out more frequently. The most environmentally significant pollutant from the combustion of coal is sulphur dioxide, combustion in combination with a proportion of RDF reduces the sulphur dioxide emission rate, because of the lower fuel sulphur content. The combustion of RDF results in increased emissions of lead to the atmosphere and increased proportions of lead in the ash and clinker remaining in the boiler or combustion system. Greater care should be exercised in cleaning systems burning RDF.

513,777
PB85-139863/GAR PC **A07**/MF **A01**
North Carolina State Univ. at Raleigh. Dept. of Civil Engineering.
Deflection Criteria for Wind Induced Vibrations in Cantilever Highway Sign Structures.
Final rept. 1 Jul 79-31 Dec 82,
J. A. Edwards, and W. L. Bingham. Sep 84, 136p
FHWA/NC-84/001
Sponsored by North Carolina Div. of Highways, Raleigh.

This study considers the vibratory characteristics of cantilever highway sign structures. During the course of the study four structures were instrumented to experimentally determine their vibration characteristics. Analytical studies were also performed, using finite element techniques. The analysis considers several types of wind loading on the structure. The analysis shows that high stress levels can be expected in these structures under severe wind conditions.

513,778
PB85-140143/GAR PC **A04**/MF **A01**
National Research Council, Washington, DC.
Structural Design of Low-Volume Roads.
Synthesis no. 4.
1982, 58p AID-PN-AAL-236
Contract AID/otr-C-1591
Sponsored by Transportation Research Board, Washington, DC.

The vast majority of roads in developing countries are low-volume roads. This report synthesizes current structural design concepts and methods for such roads. The first two chapters treat the fundamentals of road design and performance (including design and performance phases, structural and functional failure, stress distribution, serviceability and performance, distress mechanisms, and equations for predicting road roughness) and the relation of economic considerations to varying design philosophies. The next four chapters discuss key design factors: (1) traffic patterns (through mixed-traffic analysis); (2) soils and subgrades; (3) the effects of moisture and frost on the strength and volume of construction materials; (4) road surface materials, especially the granular materials and bituminous surface treatments characteristically used for low-volume roads; and (5) improvement of material quality through compaction and chemical stabilization. The last two chapters present and illustrate structural design methods used by the U.S. Army Corps of Engineers, the U.S. Forest Service, and the United Kingdom Transport and Road Research Laboratory. Included are 33 tables and 38 figures.

513,779
PB85-140234/GAR PC **A03**/MF **A01**
Water and Sanitation for Health Project, Arlington, VA.
Para Village Water Supply: Pre-Feasibility Report.
Field rept.,
W. M. Turner. Apr 82, 26p WASH/FIELD-40, AID-PN-AAL-111
Contract AID/DSPE-C-0080
Sponsored by American Embassy, Brasilia (Brazil).

Many of the enteric diseases in the Central Amazon basin are caused by unsanitary water. This prefeasibility study outlines a proposed effort by Fundacao Esperanca, a medical and public health project in the region, to dig wells and improve sanitation in the vicinity of Santarem, State of Para, Brazil.

513,780
PB85-143253/GAR PC **A09**/MF **A01**
Tennessee Valley Authority, Muscle Shoals, AL. Div. of Energy Demonstrations and Technology.

Economic Evaluation of Advanced Limestone, Davy S-H, and Dowa Gypsum-Producing FGD (Flue Gas Desulfurization) Processes.
Final rept. Jun 79-Dec 82,
R. L. Dotson, J. D. Maxwell, and T. A. Burnett. Feb 84, 199p TVA/OP/EDT-82/20, EPA/600/7-84/025

The report gives results of economic evaluations of three gypsum-producing flue gas desulfurization processes: advanced limestone (in-loop forced oxidation with adipic acid additive), Davy S-H (lime), and Dowa (aluminum sulfate, limestone). For a 500-MW power unit burning 3.5% sulfur coal and meeting the 1979 New Source Performance Standards, capital investments in 1982 costs are $93 million ($186/kW) for the advanced limestone process, $116 million ($231/kW) for the Davy S-H process, and $121 million ($243/kW) for the Dowa process. First-year annual revenue requirements in 1984 costs for these processes are $26, $33, and $32 million (9.4, 11.9, and 11.7 mills/kWh), respectively. The lower capital investment and annual revenue requirements of the advanced limestone process are due in part to the use of adipic acid, which allows partial scrubbing at 95% removal. The Davy S-H process has slightly higher annual revenue requirements than the Dowa process because lime is used, instead of limestone. Changes in power unit size and coal sulfur content affect the costs of all three processes similarly. The Davy S-H process is more sensitive to raw material costs because lime is used. Landfill waste disposal is a minor cost element in all three processes.

513,781
PB85-854149/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Travel Time Studies for Surface Transportation. July 1981-January 1985 (Citations from the NTIS Data Base).
Rept. for Jul 81-Jan 85.
Jan 85, 53p
Supersedes PB83-805101.

This bibliography contains citations concerning travel time studies pertaining to a variety of surface transportation modes. Topics include mass transit system planning, performance, and operations, travel time forecasting models, and effects of changing travel patterns and scheduling. Value aspects of travel time, and the effects of road network control systems are also discussed. (This updated bibliography contains 55 citations, 37 of which are new entries to the previous edition.)

13C. Construction Equipment Materials, and Supplies

513,782
AD-A148 705/7/GAR PC **A03**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Structures Lab.
Compressive Strength-Maturity Relationships of Mortar Containing Fly Ash.
Final rept.,
S. A. Ragan. Oct 84, 42p Rept no. WES/MP/SL-84-13

The relationships between the compressive strength and maturity of four mortar mixtures containing fly ash were evaluated. The majority of the mortar was determined using both the traditional maturity method proposed by Saul and the maturity-age procedure proposed by Freisleben-Hansen and Pedersen. Two mortar mixtures had a twenty five percent of the cement by absolute volume replaced with Class F fly ash, and two mixtures had 35 percent by the cement of absolute volume replaced with Class F fly ash. Twenty-four compressive strength specimens and three temperature monitoring specimens were fabricated from each batch and cured at the temperature of interest. The curing temperatures investigated included 40 to 80 F. The temperature-age history of the specimens was monitored continuously and compressive strength tests were conducted at various ages up to 28 days. Both the classical maturity method proposed by Saul and the maturity-age procedure proposed by Freisleben-Hansen and Pedersen estimated the compressive strength of the test specimens with a degree of success. The maturity-age procedure resulted in less scatter about the regression lines than the classical method for mortar cured at 85 F and 40-80 F. Less scatter of the classical maturity data was noted for mortar cured at 40 F.

513,783
PB85-131621/GAR PC **A03**/MF **A01**
Bureau of Mines, University, AL. Tuscaloosa Research Center.
Use of Florida Phosphogypsum in Synthetic Construction Aggregate.
Final rept.,
A. May, J. W. Sweeney, and J. R. Cobble. Sep 83, 38p FIPR/PUB-01-008-026

In its role to provide technology to promote the efficient use of minerals and mineral process waste, the U.S. Bureau of Mines has conducted research to identify and develop high volume uses for phosphogypsum. An asphalt-concrete containing 20 percent phosphogypsum met the Florida Department of Transportation specifications for their Type II, SAHM and ABC-1 asphalt concretes. Mixtures containing up to 50 percent phosphogypsum, and the remainder clays, produced aggregate when fired at 1,000C. Their compressive strengths exceeded 1,000 psi. Mixtures containing a maximum of 50 percent phosphogypsum, 6 to 10 percent lime and the remainder fly ash had compressive strengths as high as 4,800 psi. The effects of the amounts of phosphogypsum, lime and fly ash were investigated. Also, the effects of fly ash to lime ratios were studied.

513,784
PB85-135846/GAR PC **E06**/MF **E01**
Ontario Ministry of Municipal Affairs and Housing, Toronto.
Weatherize Project,
S. Moffatt. Feb 84, 109p ISBN-0-7743-9882-5

A two year research and demonstration project was undertaken by the Ontario Ministry of Municipal Affairs and Housing to demonstrate new techniques, transfer new technology and research critical issues concerning the impact of air tightening on typical houses.

513,785
PB85-136877/GAR PC **A06**/MF **A01**
Kentucky Transportation Research Program, Lexington.
Aggregate Shape and Skid Resistance.
Research rept.,
J. H. Havens, and D. C. Newberry. Jan 82, 112p UKTRP-82-1
Prepared in cooperation with Kentucky Dept. of Transportation, Frankfort, and Federal Highway Administration, Frankfort, KY. Kentucky Div.

Natural sands and sands manufactured by crushing larger parent materials are characterized and service tested. Dry-bulking tests and photomicrography are used to established qualities. Crushing some materials to coarse chip sizes leaves many smooth facets on particles that then tend to become oriented horizontally in the pavement surface. Open-graded friction courses and sprinkle treatments are included. Damage by winter freezing of porous courses is illustrated.

513,786
PB85-138279/GAR PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Hazardous Air Pollutants: Dry-Deposition Phenomena,
G. A. Sehmel, R. N. Lee, and T. W. Horst. Dec 84, 80p EPA/600/3-84/114

Dry-deposition rates were evaluated for two hazardous organic air pollutants, nitrobenzene and perchloroethylene, to determine their potential for removal from the atmosphere to three building material surfaces, cement, tar paper, and vinyl asbestos tile. Dry-deposition experiments were conducted in two stirred chambers. Building materials were placed on the bottom of the stirred chambers, and removal rates were evaluated by introducing the organic air pollutant along with nondepositing sulfur hexafluoride (SF6) tracer gas into a stirred chamber. Changes in airborne concentrations with time were then monitored. Because the HAP removal rates were small, sulfur hexafluoride tracer gas was used to evaluate the rates of leakage from the SC in order to correct the deposition rates. When HAP wall losses were assumed negligible, HAP concentration decreases (corrected using the SF6 leakage rate) ranged from near 0 to 3 %/h. Dry-deposition velocities were calculated from the rate-of-change over time of the airborne concentrations. The calculated deposition velocities were consistently small, approximately .0001 cm/sec or less. These deposition velocities reflect mostly substrate resistance, but the fan speed could not be increased sufficiently to ensure in the limit that only substrate resistance was measured.

13D. Containers and Packaging

513,787
AD-A148 836/0/GAR PC **A02**/MF **A01**
Air Force Packaging Evaluation Agency, Wright-Patterson AFB, OH.
BI-PAC F-15 External Fuel Tank Container Modification,
E. J. Kowalski. Sep 84, 25p Rept no. PTPD-84-R-02

A request was made to test and evaluate BI-PAC Fiberglass Containers, NSN 1560-01-017-0858FX, used for shipment/storage of F-15, 600-gallon external fuel tanks. Reports from WR-ALC/DSTD indicated that damage was occurring to the fuel tanks while in transit. Inspection and evaluation by AFPEA revealed a need for container modifications. Tie-down rings, stacking posts, restraint bars, and stowage positions of these items were modified. Results of the in-house testing indicate that the F-15, 600-gallon external fuel tanks can be shipped safely in the modified BI-PAC containers.

513,788
PB85-139947/GAR PC **A03**/MF **A01**
Wyle Labs., Huntsville, AL.
Test Procedure for Container Specification 49 CFR 178.224 Fiber Drum (21C).
Nov 84, 27p DOT/RSPA/DMT-12/84/45

This report describes in detail the Test Procedure to test containers meeting DOT Specification (21C). The Test Procedure is designed to determine whether or not a given 21C container meets the safety aspects of the Hazardous Materials Transportation Act of 1974 (P.L. 93-633) and the rules and regulations for the manufacture and testing of containers contained in the Federal Register (49 CFR 178.224). Basically, the Test Procedure describes in detail the tests to be conducted by the Office of Operations and Enforcement, Materials Transportation Bureau to verify that manufacturers of containers are producing products that comply with the rules and regulations contained in the Federal Register (49 CFR 178.224). This test procedure was developed after evaluating various test methods to determine the one that best meets the requirements of the regulations.

13F. Ground Transportation Equipment

513,789
AD-A148 634/9/GAR PC **A22**/MF **A01**
International Society for Terrain-Vehicle Systems.
Proceedings of the International Conference on The Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge England, on August 5-11, 1984.
Final rept. May-Aug 84,
M. J. Dwyer. Aug 84, 506p
Contract DAJA45-84-M-0251
For sales information of individual items see AD-P004 258 - AD-P004 282. See also Volume 2, AD-A148 635. Portions of Text in German and French.

The three volumes consist of a collection of all significant papers presented at the 8th International Conference. Subjects include; Tyre-soil interaction; theoretical aspects of ride dynamics; track-soil interaction; practical aspects of ride dynamics; operation in paddy fields; operation on steep slopes; soil compaction; steering; computer modelling; vehicle component design; measurement of soil and snow properties and soil bin facilities; and vehicle design. (Author)

513,790
AD-A148 635/6/GAR PC **A18**/MF **A01**
International Society for Terrain-Vehicle Systems.

Proceedings of the International Conference on The Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge England, on August 5-11, 1984.
Final rept. May-Aug 84,
M. J. Dwyer. Aug 84, 405p
Contract DAJA45-84-M-0251
For sales information of individual items see AD-P004 283 - AD-P004 306. See also Volume 1, AD-A148 634. Portions of text in German.

The three volumes consist of a collection of all significant papers presented at the 8th International Conference. Subjects include: Tyre-soil interaction; theoretical aspects of ride dynamics; track-soil interaction; practical aspects of ride dynamics; operation in paddy fields; operation on steep slopes; soil compaction; steering; computer modelling; vehicle component design; measurement of soil and snow properties and soil bin facilities; and vehicle design. (Author)

513,791
AD-P004 258/0/GAR PC **A03/MF A01**
Louvain Univ. (Belgium).
Modelisation des Pneus Hors Routes et du Sol en Vue de l'Amelioration de la Traction (Modeling of Off-Road Tyres and Soil for Improved Traction),
P. F. J. Abeels. Aug 84, 29p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p3-31.

Many effects have been observed as a consequence of introducing machinery to agricultural land and forestry. In the main these effects are due to induced compaction. Moreover, off-road development must look to more and more vehicles with different types of tyres for different purposes. Thus it is important to deal with the problems of flexible tyres in order to see how it may be possible to adapt their design to the unprepared soils on which they must run. The characteristics necessary for developing new concepts must include firstly the flexibility of the type identifying the properties of each of the principal parts of the tyre in transmitting loads to the supporting surface.

513,792
AD-P004 259/8/GAR PC **A03/MF A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Development of a Soil-Wheel Interaction Model,
G. Y. Baladi, and B. Rohani. Aug 84, 26p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p33-60.

The determination of the response of a single flexible wheel traversing a yielding (or deformable) surface is essential for the analysis of the steering performance of wheeled vehicles. Specifically, the sinkage, motion resistance, drawbar pull, torque, and side forces acting on a powered flexible wheel moving on a yielding soil must be accurately determined. Due to the overwhelming complexity of this problem, previous research in this area has been directed, by and large, towards extensive experimentation and the development of empirical equations relating the various parameters of the problem.

513,793
AD-P004 260/8/GAR PC **A02/MF A01**
McGill Univ., Montreal (Quebec).
Soil Compliance Influence on Tyre Performance,
P. Boonsinsuk, and R. N. Yong. Aug 84, 20p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p61-80.

It is not uncommon in off-road mobility for vehicles to operate over varying types of terrain. In situations where inorganic clay soils constitute the primary substrate material, considerable differences in soil stability and compliance characteristics can occur because of local variations in soil type, density and water content. This study takes into account the above constraints in the methodology developed for evaluation and prediction of efficient tyre performance. This requirement for capability in development of efficient tyre traction on soil for mobility purposes is critical if off-road operations are performed in remote regions where minimum fuel expenditure is particularly important. The developed analytical procedure utilizes the experience gained from experimental tow-bin tests which studied tyre-soil interaction under varying tyre and soil conditions.

513,794
AD-P004 262/2/GAR PC **A02/MF A01**
Vehicles Research and Development Establishment, Ahmadnagar (India).
Performance Prediction of Pneumatic Tyres on Sand,
T. Paul. Aug 84, 10p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p87-96.

In this peper the applicability of laboratory test results on the scaled models of pneumatic tyres in the dry sand test bins to predict mobility of vehicles in actual desert conditions in Western Rajasthan has been studied by a field test programme. The tests conducted at two test sites 150 km apart show that the mobility equations derived by laboratory tests could to a fair degree of accuracy predict the trafficability over sand in actual field conditions of varying soil strength. (Author)

513,795
AD-P004 263/0/GAR PC **A02/MF A01**
Institute for Mechanization, Novi Sad (Yugoslavia).
Effects of Slip on Energy Distribution between Tyre and Soil,
M. Ronai. Aug 84, 11p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p97-107

Any calculation of the drawbar pull of a agricultural tractor moving over agricultural land requires a detailed study of power losses thereby occuring, which may, in principle, be defined as fellows: losses depending on pneumatic tyres and; losses in connection with the soil, including interface phenomenons occuring between tyres and soil.

513,796
AD-P004 264/8/GAR PC **A02/MF A01**
Instytut Budownictwa, Mechanizacji i Elektryfikacji Rolnictwa, Warsaw (Poland).
Traction Forces of Drive Tyre on the Compacted Soil,
J. Swiech. Aug 84, 12p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p109-120.

Kind of soil and its condition exerts an important influence on the size of traction forces achieved by driving systems. The kind of soil determined by its mechanical composition may be assumed as unaltered even for a long period of time. The condition of soil determined by its physical and mechanical properties is dependent on the kind of cultivation, vegetation humidity and compaction. As a result the value of traction forces depends on the temporary condition of soil. In order to find out the value of traction forces as influenced by the compaction of soil traction tests of tractor drive tyre were effected at the Institute for Buildings, Mechanization and Electrification in Agriculture in Warsaw. Tests dealt with in this report were made under humidity of soil and operation parameters of the tyre (vertical load and inflation pressure) kept fixed while changing the compaction of soil.

513,797
AD-P004 265/5/GAR PC **A03/MF A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Prediction of In-Sand Tire and Wheeled Vehicle Drawbar Performance,
G. W. Turnage. Aug 84, 30p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p121-150.

In an appendix of the ISTVS 6th International Conference Paper, A Synopsis of Tire Design and Operational Considerations Aimed at Increasing In-Soil Tire Drawbar Performance, the author developed a procedure for defining Ge, effective sand penetration resistance gradient. Ge was devised to approximate the value of G that predominated during a given tire pass, normalized to one type of frictional soil (selected as Yuma sand). Ge subsequently served as the soil strength term in sand-tire numeric Nse, which aimed at providing a normalized description of tire drawbar performance in different types of sands. Because the range of sand types included in the development of Ge and Nse was necessarily quite limited, the author suggested in the Synopsis paper that other investigators test the universality of relations involving Nse and tire drawbar performance by using tire test results obtained in a variety of sands.

513,798
AD-P004 266/3/GAR PC **A02/MF A01**
Royal Military Coll. of Science, Shrivenham (England).
Dynamic Simulation of Track Laying Vehicles,
M. D. Bennett, and P. H. G. Penny. Aug 84, 18p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p153-170.

A computer model to simulate the dynamic response of a track laying vehicle traversing defined terrain is described. Results used for validation tests are given together with a selection of typical applications. The model has proved to be flexible with applicability to a wide range of problems. (Author)

513,799
AD-P004 267/1/GAR PC **A02/MF A01**
Leeds Univ. (England). Dept. of Mechanical Engineering.
Designing Off-Road Vehicles with Good Ride Behaviour,
D. N. L. Horton, and D. A. Crolla. Aug 84, 14p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p171-184.

The results from simple ride vibration models of off-road vehicles are examined in terms of natural frequencies, mode shapes, frequency response and response to realistic ground inputs. Despite the limitations of such models inherent in the assumptions, it is concluded that they provide designers with useful information about the dominant features of vehicle ride response. (Author)

513,800
AD-P004 268/9/GAR PC **A03/MF A01**
Technische Hochschule, Aachen (Germany, F.R.). Inst. fuer Kraftfahrwesen.
Theoretische Untersuchung Einer Aktiv-Federung fuer Rad-Schlepper (A Theoretical Investigation of an Active Suspension System for Wheeled Tractors),
H. Junker, and A. Seewald. Aug 84, 30p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p185-214. Test in German and English.

Wheeled tractors, because of their operating conditions on uneven field tracks and in unconsolidated terrain, are, as a rule, subjected to strong vertical vibrations. Since, in addition, a separate suspension system for the tractor is deliberately rejected because of a conflict of aims with the correct fulfilment of important work tasks, the driver is liable to high vibration loads which, in extreme cases, can lead to reduced performance and even damage to health.

513,801
AD-P004 269/7/GAR PC **A15/MF A01**
Technische Univ., Berlin (Germany, F.R.).

Leistungssteigerung und Verbesserung des Fahrkomforts Bei Selbstfahrenden Baumaschienen Durch Reduzierung Einsatbedingter Nick- und Hubschwingungen (Increase in Performance and Improvement of Ride Comfort of Self-Propelled Construction Machinery by Reducing Pitch and Vertical Vibration),
W. Poppy, and A. Ulrich. Aug 84, 341p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p215-256. Text in German and English.

Self-propelled unsprung construction machines - such as tractor-loaders and mobile cranes - are prone to pronounced pitching motion on uneven driving surfaces even at low forward speeds. Because of the dynamic loads which thus occur, the driver, machine and the driving surface are highly stressed and in unfavourable conditions are considerably endangered.

513,802
AD-P004 270/5/GAR PC A02/MF A01
Okayama Univ. (Japan).
Stresses in Situ Generating by Bulldozers,
H. Fujii, T. Sawada, and T. Watanabe. Aug 84, 18p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p259-276.

The author carried out full-scale field tests and measured stresses in situ generating by bulldozers. These data were analyzed experimentally as well as theoretical by making numerical models. Five bulldozers are used on different types of soil such as cohesive soil, sandy soil and rockfill materials. Most measured stresses are much larger than the stresses calculated from nominal contact pressure. The stress variation by travelling a bulldozer on the ground, that is the time-stress (tau-delta) relation or curve on the oscillograph shows particular shapes as if it were random vibration.

513,803
AD-P004 271/3/GAR PC A02/MF A01
Grumman Aerospace Corp., Bethpage, NY. Research and Development Center.
Finite Element Analysis of Ground Deformation Beneath Moving Track Loads,
L. L. Karafiath. Aug 84, 14p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p277-290.

The major portion of the motion resistance forces encountered by vehicles traveling off-road is caused by the deformation of the ground under the vehicle load. Tracks were originally conceived as implements to distribute the vehicle load over a large area and thereby reduce the pressure to, and deformation of the ground. Tracked vehicles with rigid suspension systems distribute ground pressures nearly evenly and can, at low speed, traverse soft terrain not negotiable by other vehicles.

513,804
AD-P004 273/9/GAR PC A02/MF A01
Politechnika Warszawska (Poland).
Die Abhaengigkeit der Bodentragfaehighkeit und der Zugkraft von der Abstandgroesse der Bodenplatten (The Dependence of Soil Bearing Capacity and Drawbar Pull on the Spacing between Track Plates),
A. Mierzwicki. Aug 84, 16p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p313-328. Text in German and English.

The spacing between track plates has hitherto been defined in theoretical and experimental work in terms of the criterion of maximum shearing stresses (maximum thrust). The geometry of the spaced link track was defined in this way. Spacing equivalent to 2-3 widths of a single track plate ensures a larger overall shearing stress PH by comparison with the traditional track (without spacing). The increase in stress PH is limited by the maximum track plate pressure, which should not exceed 0.04 MPa.

513,805
AD-P004 274/7/GAR PC A02/MF A01
Industrieanlagen-Betriebsgeselischaft m.b.H., Ottobrunn (Germany, F.R.).
Dynamic Interaction between Track and Soil,
P. Parringer. Aug 84, 19p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p329-347.

The knowledge of the dynamic interaction between track and soil is important to analyze high speed vehicles with flexible track. This paper describes a possible method for the measurement of this interaction. Force- and displacement-sensors are fixed in and on the track to measure longitudinal-, transversal- and normal-load at one track-shoe, sinkeage of this track-shoe and the longitudinal- and transversal slip of this track shoe.

513,806
AD-P004 275/4/GAR PC A02/MF A01
Politechnika Warszawska (Poland).
Analysis of Ground Pressure Distribution Beneath Tracked Model with Respect to External Loading,
M. M. Poncyliusz. Aug 84, 12p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p349-360.

This paper is a continuation of the investigation, results of which were presented at the last Conference ISTVS in Calgary in 1981 /Traction Investigation of a Tracked Vehicle Model/. The results obtained then permitted to draw certain conclusions, however the necessity of rearrangement concerned with the test model and the frame of conducted investigation appeared simultaneously.

513,807
AD-P004 276/2/GAR PC A02/MF A01
Carleton Univ., Ottawa (Ontario).
Comparison between a Conventional Method and an Improved Method for Predicting Tracked Vehicle Performance,
J. Y. Wong, and J. Preston-Thomas. Aug 84, 20p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p361-380.

One of the most widely used conventional methods for predicting tracked vehicle performance is based on the assumption that the track in contact with the terrain is equivalent to a rigid footing. Furthermore, a uniform normal pressure distribution over the entire contact area is assumed if the centre of gravity of the vehicle is located at the midpoint of the contact length. On the other hand, if the centre of gravity is located in front of or behind the midpoint of the contact length or if load transfer due to drawbar pull takes place, a sinkage distribution of trapezoidal shape will then be assumed. Based on these assumptions and the measured pressure-sinkage and shear stress-displacement relationships of the terrain, the tractive performance of tracked vehicles is predicted.

513,808
AD-P004 277/0/GAR PC A02/MF A01
McGill Univ., Montreal (Quebec). Geotechnical Research Centre.
Effect of Hitch Positions on the Performance of Track/Grouser Systems,
R. N. Yong, H. Elmamlouk, and N. Skiadas. Aug 84, 17p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p381-397.

A number of previous research studies have been performed with the objective of developing a model to predict the performance and efficiency of tracks on ground terrain. For proper modelling, several approaches documented in the literature have been used on: (1) Strip footing idealization of the track contact area with elastic stress distribution in the soil; (2) Energy dissipation within the failed soil mass; and (3) Energy conservation considerations for the track/grouser-soil system.

513,809
AD-P004 278/8/GAR PC A02/MF A01
North Vehicle Research Inst., Beijing (China).
Grouser Effect Studies,
K. J. Zhang. Aug 84, 12p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p399-410.

After having finished the nonlinear finite element analysis of the sands under the tracked vehicle by a nonlinear finite element analysis program called NFAP, A modified Duncan model based on soil triaxial testing was suggested. The results of the experiment and the values predicted are well coincidence. The studies show that the grouser has important effect for the thrust on sands. (Author)

513,810
AD-P004 279/6/GAR PC A02/MF A01
Austrian Federal Army, Vienna.
Ride Comfort of Off-Road Vehicles,
G. H. Hohl. Aug 84, 20p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p413-432.

Because of the roughness of the terrain they encounter, cross country vehicles experience more shock and vibration than ordinary road vehicles. Hence off-road speed is usually limited by the ability of the operator to withstand these vibrations to negotiate and to retain adequate control of the vehicle. In addition to other factors, the comfort of the operator, which contributes to his general safety, also depends on the physical characteristics of the seat, which is the link between the driver and the vehicle.

513,811
AD-P004 280/4/GAR PC A02/MF A01
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Further Development in Ride Quality Assessment,
N. R. Murphy, Jr. Aug 84, 17p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p433-449.

Internationally, a growing concern has developed and widespread disagreement has occurred over the present methods for quantitatively describing and assessing the effects of vehicle vibrations on humans, and over the short- and the long-term effects of vibrations on drivers and occupants of heavy trucks, agricultural and earthmoving equipment, and military vehicles. None of the present methods is completely satisfactory; in fact, most criteria were developed for low-level boulevard rides and are highly suspect when applied to the several vibrational levels conducted in earthmoving and military-type operations.

513,812
AD-P004 281/2/GAR PC A02/MF A01
Battelle-Inst. e.V., Frankfurt am Main (Germany, F.R.).
Comparison of Measured and Simulated Ride Comfort for an Agricultural Tractor and Influence of Travel Speed and Tyre-Inflation Pressure on Dynamic Response,
C. Strauss, and W. Christ. Aug 84, 21p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p451-471.

Off-road vehicles, wheeled or tracked, such as commercial vehicles (e.g. agricultural wheeled tractors, scrapers, excavating machines, trucks, truck tractors) or military vehicles (e.g. trucks, armoured vehicles and special-purpose vehicles) have to operate under extreme terrain conditions. One aspect of these conditions is the terrain roughness, which has an important influence, on the one hand on the vehicle stress, on the cargo or attached implements, and on the other hand on the ride comfort for the driver. Therefore, the need for reducing the shock and vibration levels, taking into account increasing travel speed, becomes

an important criterion for the design of most of the above vehicles.

513,813
AD-P004 282/0/GAR PC A02/MF A01
Hokkaido Univ., Sapporo (Japan).
Characteristics of Farm Field Profiles as Sources of Tractor Vibration,
K. Ohmiya, and K. Matsui. Aug 84, 19p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p473-491.

To evaluate farm field profiles as sources of tractor vibration, profiles of meadows and rough terrains were measured and analyzed. A slope angle measuring apparatus with a vertical gyroscope was made to measure profiles using the slope integration method. Periodic unevenness was not found in the measured profiles, therefore it may be assumed that profiles of farm fields, except plowed field with furrows, are random and non-periodic. Power spectral densities(0.1-3.5c/m) of measured profiles could be approximated by a straight line on a log-log paper.

513,814
AD-P004 283/8/GAR PC A02/MF A01
Jilin Univ. of Technology, Changchun (China).
Resource of Driving Wheel with Movable Lugs of the Paddy Field Floating Tractor,
C. Bing-cong, and C. Yu-fan. Aug 84, 11p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p495-506.

This paper discussed the kinematics and dynamics of the paddy wheel with movable lugs penetrating into and coming out from soil perpendicularly. The calculation of the electric computer shows that for the requirement of a certain tractive force the wheel should have a certain sinkage so that it has the optimal tractive efficiency. The experiment on the specific test bench designed by the author shows: this type of wheel has a less rolling resistance and a higher tractive efficiency. (Author)

513,815
AD-P004 284/6/GAR PC A02/MF A01
Tractor Research Inst. of China, Luoyan.
Investigation of the Driving Wheel Thrust of Paddy Field Tractors,
D. Zhuorong, and Y. Shucheng. Aug 84, 13p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p507-519.

In this paper, the producing process of the driving wheel thrust of paddy field tractor is analyzed through experiments made in a soil bin. In essence, it is a process in which the wheel lugs are moved against the soil so that the soil in the neighborhood of contact surface is compressed and sheared. The methods for predicting the driving wheel thrust and the lug motion trajectory of paddy field tractor are proposed. The predicted values of the thrust are compared with those obtained through experiments. It shows that the predicted thrust agrees fairly satisfactorily with the measured results. (Author)

513,816
AD-P004 285/3/GAR PC A02/MF A01
Tsukuba Univ. (Japan). Inst. of Agricultural Engineering.
Mobility of the Small Combine (Track Type) on Soft Ground -Relationship between the Position of the Center of Gravity and the Mobility,
H. Eseki. Aug 84, 17p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p521-537.

In East Asia, approximately one million small-sized rice combines have been used on paddy fields. The objective of this study is to carry out fundamental investigations on the mobility of small combines associated with changes in the position of the center of gravity. The relationship between the position of the center of gravity and the performance of the combine in straight and circular drive was analysed. (Author)

513,817
AD-P004 287/9/GAR PC A02/MF A01
Carleton Univ., Ottawa (Ontario).
Behaviour of Soil under a Lugged Wheel,
S. X. Wu, J. H. Hu, and J. Y. Wong. Aug 84, 15p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11,' 1984, AD-A148 635, p545-559.

Wheels with a narrow rim and large lugs are widely used in Southeast Asia on tractors for paddy fields. The lugs of these wheels perform one or both of the following two functions: developing tractive effort and supporting vehicle weight. A great deal of field data on the performance of these wheels have been accumulated over the years. The mechanics of this type of wheel, however, has not yet been fully elucidated. To reach a better understanding of the physical nature of the problem, an investigation into the interaction between the lugs of the wheel and the soil was carried out.

513,818
AD-P004 288/7/GAR PC A02/MF A01
Kyoto Univ. (Japan).
Prediction Accuracy of the Torques for Rotary Tillage by an Analog Tool,
M. Yamazaki, and T. Tanaka. Aug 84, 13p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11,' 1984, AD-A148 635, p561-573.

Performances of prototype in soil-machine systems have been investigated and predicted by scale model data using similitude theory. However, a satisfactory prediction is not attained especially in common soil conditions where distortions occur, since present knowledge of soil-machine interactions is meager. The objective of this study is to investigate the usefulness or feasibility of an analog predicting torques on rotary blades which bring about a considerable high speed interaction. An analog prediction technique developed by Schafer et al. was used.

513,819
AD-P004 289/5/GAR PC A02/MF A01
International Society for Terrain-Vehicle Systems.
Analysis on the Dynamic Performance of a Single Lug,
T. L. Zhang, and Y. J. Shao. Aug 84, 17p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p575-591.

The lug of a rigid lugged wheel for the paddy-field tractor is the basic element to interact with soil. The lug angle has significant effect on the tractive performance of a rigid lugged wheel in rice field. This paper analyses the interaction process between lug and soil. A calculating method of soil reaction on a single lug based on the equation of passive pressure in two dimensional soil failure is presented. It is shown that there is a good agreement between the measured and predicted pull and lift forces developed by a single lug within the test range.

513,820
AD-P004 290/3/GAR PC A02/MF A01
Vyzkumny Ustav Zemedelskych Stroju, Chodov (Czechoslovakia).
Study of the Motion of Agricultural Vehicles on Steep Grass-Covered Slopes,
A. Grecenko. Aug 84, 20p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11,' 1984, AD-A148 635, p595-614.

In large-scale farming ploughing is generally practiced up to 15 deg of slope, the reason of this limitation being not only the safety of operation but also the decreasing layer of tilth and erosion as well. Steeper slopes are generally covered with grass which is either harvested or grazed. The experience indicates that adapted four-wheel drive tractors with conventional tyres can harvest grass under favourable conditions on slopes up to 20 deg. For treatment and harvesting on slopes up to 26 deg special light-weight machines with low pressure tyres are used; these are able to cross some local gradients up to 33 deg by means of adequate manoeuvring.

513,821
AD-P004 291/1/GAR PC A02/MF A01
Scottish Inst. of Agricultural Engineering, Penicuik.
Some Stability and Control Problems with Trailed Farm Tankers on Slopes,
A. G. M. Hunter. Aug 84, 19p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p615-633.

Trailed farm tankers in Britain, which are generally used either for slurry spreading or crop spraying, have become very large in recent years. The fluid contents, which may be four times as heavy as the towing tractor, will move under gravity inside a partly full tanker and this introduces problems while driving on slopes, which have not been recognised previously. The fluid movement will affect both the stability of the tanker and the control of the tractor and trailer combination. Recent accidents where tankers overturned due to loss of stability, and where tractor and trailer combinations slid downhill due to loss of control led to extensive research on tankers.

513,822
AD-P004 292/9/GAR PC A02/MF A01
Scottish Inst. of Agricultural Engineering, Penicuik.
Control of Tractors on Sloping Ground,
H. B. Spencer, and K. A. Crolla. Aug 84, 19p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11,' 1984, AD-A148 635, p635-653.

Tractor and agricultural accidents on slopes fall into two categories. The most well known is a stability loss accident in which the tractor simply overturns. Much more common is the sliding control loss accident, frequently termed a runaway by farmers. The runaway description is apt because this is exactly how it appears to the driver - an uncontrolled speed build up when descending a slope. The accident occurs when the wheel-ground forces in the plane of the ground are no longer sufficient to maintain equilibrium on the slope. These accidents often lead to overturns of varying severity incidents have been reported of tractors travelling up to 1.5 km from the point of control loss before coming to rest.

513,823
AD-P004 294/5/GAR PC A02/MF A01
Technische Univ., Munich (Germany, F.R.).
Pressure Tests in Soil below Tires of Agricultural Vehicles,
I. Bolling. Aug 84, 16p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p675-690.

Design and measuring method of a cheap and efficient soil pressure gauge are described. Soil tank tests carried out in the laboratory demonstrate some properties of the gauge like indifference towards orientation in soil. In the soil bin the gauge measures pressures below tires rolling over and outside in the field the influence of wheel load, number of passes and vehicle speed are investigated. The results are interpreted with modified formulas of Soehne, which can be managed by a pocket calculator. (Author)

513,824
AD-P004 296/0/GAR PC A02/MF A01
Sveriges Lanttbruksuniversitet, Garpenberg.
Smoother Terrain-Machine,
B. Marklund. Aug 84, 17p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge,

England on August 5-11, 1984,' AD-A148 635, p707-723.

Damages by terrain-vehicles on the ground and growing trees is a problem of increasing importance in forest operations, primarily in thinnings. These damages cause considerable loss of volume and quality yield in subsequent harvesting operations. The importance of this problem is expected to increase for several reasons. One is the continuously increasing area of thinning stands due to an uneven age distribution of Swedish forests.

513,825
AD-P004 297/8/GAR PC **A02/MF A01**
Military Technical Coll., Cairo (Egypt).
Compaction of Sand Using Ordinary Off-Road Vehicles,
S. Shaaban. Aug 84, 11p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p725-735.

This paper examines the possibility of compacting a sandy soil using ordinary off-road vehicles instead of compactors. Laboratory tests showed that a considerable compaction of sand can be achieved if alternative cyclic stresses are applied. Such stresses can be generated if a train of two vehicles is employed for compaction: one vehicle with all wheels driven towed another vehicle having all wheels towed. Compaction was made by making consecutive passages of the train of two vehicles.

513,826
AD-P004 298/6/GAR PC **A02/MF A01**
Scottish Inst. of Agricultural Engineering, Penicuik.
Simple Prediction Model for Soil Compaction under Various Wheel Loads and Geometries as an Aid to Vehicle Design,
D. L. O. Smith. Aug 84, 13p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p737-749.

The simple, numerical model was developed, as an aid to vehicle design, to predict changes in the dry bulk density of a soil due to the passage of a wheel, or wheels, over the soil surface. The model uses Soehne's solutions to estimate stress increases, and empirical isotropic changes below a wheel. Accurate predictions of final dry bulk density for a layered soil require a more rigorous model and reliable data for the soil under consideration.

513,827
AD-P004 299/4/GAR PC **A02/MF A01**
National Tillage Machinery Lab., Auburn, AL.
Flotation Tires and Subsurface Compaction,
J. H. Taylor, and E. C. Burt. Aug 84, 9p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p751-759.

Theoretical and applied research has shown that the pressure at a point in the subsurface soil is a function of both the surface unit pressure and the extent of the area over which it is applied (total load). Thirty years ago, most of the soil compaction from vehicle traffic was in the plow layer and was removed by normal cultural practices. As equipment has increased in size and mass, machine designers have increased tire sizes to keep the soil surface unit pressure relatively constant. However, the increase in total axle loads is believed to have caused an increase in compaction at any given depth in the soil profile, resulting in significant compaction in the subsoil.

513,828
AD-P004 300/0/GAR PC **A02/MF A01**
East of Scotland Coll. of Agriculture, Edinburgh.
Tractor Power Selection with Compaction Constraints,
B. D. Witney, E. B. Elbanna, and K. E. Oskoui. Aug 84, 13p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p761-773.

In the absence of a practical monitor of soil compaction, the increasing size of agricultural tractors is largely dominated by the upward trend in labour charges. The object of this study is to assess the feasibility of developing a compaction penalty index as a function of the penetration resistance of the soil and soil type.

513,829
AD-P004 301/8/GAR PC **A02/MF A01**
Wroclaw Technical Univ. (Poland).
Guidelines to Design the Lever Turning Gears in Articulated Vehicles,
P. A. Dudzinski, and H. Hawrylak. Aug 84, 11p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p777-787.

The landmark in machine development, particulary in loading and earth moving machines was the introduction of an articulated chassis. It considerably increased their manoeuvrability and turning abilities and improved other performance parameters in relation to the machines was steered wheels. The idea of an articulated vehicle dates back to as early as 19th century. Later years brought about the solutions of articulated vehicles suggested by a number of firms. For many years, however, the designers did not utilize this way of steering. The effective application of articulated machines was accelerated only by the development of drive systems, particularly of hydraulic ones.

513,830
AD-P004 302/6/GAR PC **A02/MF A01**
National Defense Academy, Yokosuka (Japan).
Study on Controllability and Stability of High Speed Tracked Vehicles,
F. Eiyo, and M. Kitano. Aug 84, 14p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p789-802.

Numerous studies on mobility of tracked vehicles such as bulldozer and crawler tractors have been performed. The stationary turning motions of these vehicles have been reported recently. Most of these studies have been concerned with trafficability and traction mechanics in vehicle terrain interaction because these vehicles are used mainly in off-road motion at low speeds. However, there has not been any reported studies dealing with the controllability and stability of vehicles at high speeds.

513,831
AD-P004 303/4/GAR PC **A02/MF A01**
National Inst. of Agricultural Engineering, Silsoe (England).
Forces on Undriven, Angled Wheels,
M. McAllister. Aug 84, 17p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p803-819.

Rolling resistance and steering forces were measured on six tyres in a variety of field conditions. The six tyres covered the range of tread pattern and loads that are currently in use in agriculture on tractor front wheels, implements and trailers. Tractor rear tyre sizes and driven wheels were not used for this work. A correlation was found between coefficient of rolling resistance and mobility number.

513,832
AD-P004 304/2/GAR PC **A02/MF A01**
Kyoto Univ. (Japan).
Turning Behaviour of Articulated Frame Steering Tractor,
A. Oida. Aug 84, 13p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p821-833.

An articulated frame steering tractor, of which construction was derived from that of a loader, consists of two parts. Those are a front part with a front axle and a rear part with a rear axle in the case of the wheeled tractor. When a steering handle rotates, the two parts bend with each other around a bending point by elongation and shortening of a hydraulic cylinder, of which both ends are respectively attached on each part. A bending angle reaches to about 38 degrees in right or left direction for a commercial articulated tractor (See reference).

513,833
AD-P004 305/9/GAR PC **A02/MF A01**
Hochschule der Bundeswehr, Hamburg (Germany, F.R.).
Tracked Vehicle Test Plant for the Simulation of Dynamic Operation,
I. C. Schmid. Aug 84, 19p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p835-853.

In 1982, a modern test plant was taken into operation at the University of the German Armed Forces in Hamburg, which has very good dynamic properties that make it possible to simulate not only rolling resistance, but also the inertia of vehicle mass and the turning resistance of a tracked vehicle. Herewith, the dynamic loads of real vehicle action on the road and in the terrain can be run on the test stand, true to reality, as it has not been feasible on power test stands employed so far.

513,834
AD-P004 306/7/GAR PC **A03/MF A01**
Technische Univ., Munich (Germany, F.R.).
Profileinfluss Auf Widerstands- und Lenkkraefte Frei Rollender Reifen (Influence of Tyre on Resistance - and Steering Forces of Tyres),
H. Schwanghart, and K. Rott. Aug 84, 34p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p855-888. Text in German and English.

There are numerous publications about forces on tires acting in or against travel direction, drawbar pull and rolling resistance, but only a few about lateral forces on steered tires. A test equipment, which provided a wealth of information of lateral-and travel resistance of front wheels in recent years, has been further developed for testing implement tires. This setup is mounted rigid on a tractor Unimog and provides measurements of longitudinal and lateral forces on tire at steering angles from 0 deg to 30 deg with different load up to 1,3 t.

513,835
AD-P004 307/5/GAR PC **A02/MF A01**
Tokai Univ., Hiratsuka (Japan).
Basic Study on the Turning Resistance of Track,
N. Sugiyama, and H. Kondo. Aug 84, 11p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p889-899.

In recent years, the construction equipments have been even used on the soft ground. The vehicles of crawler type, such as bulldozer, are superior in the trafficability of off the road. On the contrary, the turning resistance may be several times larger than that of straight travelling. Therefore the turning performance of tracked vehicles gives a serious problem. Formerly, the turning resistance was calculated by using the adhesion coefficient or coefficient of slip resistance between soil and under side of the track. But the turning resistance of the track should consist of the slip resistance of its bottom and the bulldozing resistance due to the passive earth pressure produced by side face of the track.

513,836
AD-P004 308/3/GAR PC **A02/MF A01**
National Defense Academy, Yokosuka (Japan).
Study on Steerability of Articulated Tracked Vehicles,
K. Watanabe, and M. Kitano. Aug 84, 15p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 2. Held at Cambridge,

England on August 5-11, 1984,' AD-A148 635, p901-915.

In previous paper, we have presented available equations of motion for analyzing the plane motion of the couple(non-articulated) tracked vehicles with tow-pins. In this paper, a mathematical analog for predicting the steerability of articulated tracked vehicles has been developed and computerized for numerical application. The analog contains all the basic parameters such as the vehicle characteristics and terrain factors related to steering problems of the vehicle. The accuracy of the analog in application has been verified by scale model tests and predictions proved quite satisfactory.

513,837
PB85-136042/GAR PC **E05/MF E01**
Mitsubishi Electric Corp., Tokyo (Japan).
Mitsubishi Denki Giho, Vol. 58, No. 10, 1984.
c1984, 78p
Text in Japanese. See also PB85-136059 through PB85-136109 and PB85-111449.

The issue contains research report on subjects such as: An Electronic Control System for Carburetors; An Electronically Controlled Suspension System; A High-Sensitivity FM Radio; Recent Chassis Dynamometers for Vehicle Testing; A Bar-Code Printing System; Insulation Diagnosis of Large DC Motors for Hot-Rolling Mills; Attitude-Control Software for Onboard Satellite Computers; An 1,000V, 1,500A Light-Triggered Thyristor and Its Characteristics; MELFLEX 330 Remote Supervisory-Control Equipment.

513,838
PB85-136083/GAR
(Order as PB85-136042/GAR, PC **E05/MF E01**)
Mitsubishi Electric Corp., Tokyo (Japan).
Electronically Controlled Suspension System,
S. Wada, and M. Hirata. c1984, 6p
Text in Japanese.
Included in Mitsubishi Denki Giho, v58 n10 p20-25 1984.

Mitsubishi Electric has developed, in cooperation with Mitsubishi Motors Corporation, an electronically controlled suspension (ECS) system that well satisfies the demands for both a comfortable ride and drive stability. One important features of this ECS is its combination of the vehicle-height control function with the functions for selecting spring constants and damping force, and the high reliability of its sensors, actuators and control unit. The article includes descriptions of the system configuration and its functions.

513,839
PB85-136471/GAR PC **E04/MF E04**
Centre de Recherches Routieres, Brussels (Belgium).
Mode Operatoire: Mesure du Bruit de Contact Pneu/Route (Operating Mode: Measurement of Tire/Road Contact Noise).
c1984, 40p MF-50/84
Text in French.

A mode of operation is described for measuring the noise level due to tire/road contact of a rolling vehicle in free deceleration, with the engine turned off. The first section deals with measuring the level of maximum noise emitted outside of the vehicle passing in front of a stationary microphone. Part Two concerns measurement of the average noise level prevailing within the (inhabited) vehicle.

513,840
PB85-136162/GAR PC **A02/MF A01**
Environmental Protection Agency, Ann Arbor, MI. Test and Evaluation Branch.
Ambient Versus Predicted Carbon Monoxide Levels.
Technical rept.,
M. Wolcott. Sep 82, 18p EPA/AA/TEB/EF-82-4
See also PB81-238305.

MOBILE2 is a computer program that calculates emission factors for hydrocarbons, carbon monoxide, and oxides of nitrogen for highway motor vehicles. The program uses the calculation procedures described in the Compilation of Air Pollution Emission Factors: Highway Mobile Sources, (EPA 460/3-81-005, PB 81-238305), to calculate emission factors for eight individual vehicle types in three regions of the country. These emission estimates depend upon various conditions, such as ambient temperature and vehicle usage. MOBILE2 can estimate emission factors for any calendar year between 1970 and 2020. Various groups have tried to characterize the accuracy of the MOBILE2 emission factors model by comparing its emissions results to air quality measurements during the 1970-1980 period. This report shows that such comparisons are sensitive to the input assumptions used to generate the emission results.

513,841
PB85-136253/GAR PC **E04/MF E04**
Transport and Road Research Lab., Crowthorne (England).
Monitoring Demand-Responsive Transport for Disabled People: The Readibus Example.
Supplementary rept.,
M. J. Heraty. c1984, 27p TRRL/SR-828

This report is based on a study into the operations and cost-effectiveness of a special bus service for people in Reading with permanent or temporary disabilities. The background to the provision of special services is discussed, including the different approaches to service planning which may be used. The use of operating indices in analyzing and improving service efficiency is described and discussed. Alternative ways of providing transport for the disabled are analyzed in the context of the Readibus operation. General lessons are drawn which may be applicable to similar services elsewhere. In the report, reference is made not only to Readibus but also to earlier services in North America and more recently-established schemes in Britain. (Copyright (c) Crown Copyright 1984.)

513,842
PB85-136303/GAR PC **A02/MF A01**
Texas Transportation Inst., College Station.
Motorcycle Brake Test Procedure Validation. Summary Report.
Final rept. Oct 80-Mar 83,
M. L. Love, and R. D. Tonda. Mar 83, 17p TTI-ARP-4377-1, DOT-HS-806 441
Contract DTNH22-80-R-07622

A procedure for measuring motorcycle braking performance by the tow-method was validated. Three motorcycles were subjected to this procedure, which was developed for NHTSA by the Highway Safety Research Institute of the University of Michigan. A water delivery system was added to the test hardware and a Wetted Performance section was integrated into the existing test program. The testing showed that the procedure addresses the problems of test rider safety and proportioning of braking effort satisfactorily. Good correlation was shown between the water delivery system and the TTI rainfall simulator.

513,843
PB85-136477/GAR PC **E04/MF E04**
Transport and Road Research Lab., Crowthorne (England).
Effect of Fuel Price on Fuel Use and Travel Patterns.
Laboratory rept.,
B. H. Bland. c1984, 34p TRRL/LR-1114

The LUTE model of travel by car, bus and on foot has been used to study the effect of increasing fuel prices on travel and fuel use, subject to time and trip number budget constraints on the travellers, and financial and vehicle capacity constraints on the bus services provided. The modelling predicts an elasticity of car use with respect to fuel cost per kilometer travelled of about -0.5, consisting of -0.3 due to changes in car trip lengths and -0.2 due to changes in car ownership, with a negligible contribution from changes in the number of journeys per car, values consistent with reported estimates from time-series analyses when allowances have been made for differences in time scale and scope. (Copyright (c) Crown Copyright 1984.)

513,844
PB85-139590/GAR PC **A04/MF A01**
General Accounting Office, Washington, DC. Resources Community and Economic Development Div.
Department of Transportation's Motor Vehicle Defect-Testing Procedures Were Reasonable--Public Announcements of Potential Safety Defects Could Be Improved.
9 Nov 84, 56p GAO/RCED-85-28, B-213545

This report summarizes the results of our review of the National Highway Traffic Safety Administration's program to test motor vehicles for safety-related defects. The report also discusses the Safety Administration's investigation of an alleged rear axle separation problem with General Motors Corporation's 1978, 1979, and 1980 A-body cars and trucks, including the Safety Administration's release to the media of film prepared of tests conducted to demonstrate the consequences of that problem.

513,845
PB85-139608/GAR PC **A04/MF A01**
Mandex, Inc., Vienna, VA.
Brake Performance Levels of Trucks: 1983.
Final rept.,
E. O. Hargadine, and T. M. Klein. Sep 84, 66p
Contract DTFH61-83-C-00082

This study analyzed the results of braking performance tests conducted by the Bureau of Motor Carrier Safety in 1983-1984 and compared them with tests conducted in 1974. The general conclusions were: (1) The 2-axle trucks (both lightweight and heavy) did not perform as well in 1983-84 as they did in 1974. (2) The 3-axle trucks exhibited significantly improved performance since 1974 although their compliance compared to that of other configurations is low. The performance of truck-trailer configurations also improved although not as much as that of the 3-axle trucks. (3) The change in the performance of tractor-semi configurations was not as great as in the configurations already mentioned. None of the tractor-semi configurations improved very much and the data indicated that their performance may have deteriorated somewhat. (4) Earlier brake tests indicated a need for increased maintenance, and the 1983-84 tests show that brake maintenance is still a problem. The percentage of brakes out of adjustment ranged from 26 to 36 percent for the various vehicle configurations and for the samples as a whole, 30 percent of the brakes of the vehicles tested were out of adjustment.

513,846
PB85-140010/GAR PC **A99/MF E03**
National Highway Traffic Safety Administration, Washington, DC.
International Technical Conference on Experimental Safety Vehicles (6th) Held at Washington, DC. on October 12-15, 1976.
1976, 830p DOT-HS-802 501
See also PB84-207992.

The following topics were discussed at the Conference: Vehicle structural properties and occupant protection, accident analysis, accident avoidance, biomechanics, pedestrian impact and dummies, and future vehicle safety and development.

513,847
PB85-140044/GAR PC **A99/MF E04**
National Highway Traffic Safety Administration, Washington, DC.
International Technical Conference on Experimental Safety Vehicles (8th) Held at Wolfsburg, West Germany on October 21-24, 1980.
Oct 81, 1106p DOT-HS-805 555
See also PB85-140085.

Contents: Awards presentation; Government status reports; Results of Experimental Safety Vehicles (ESV) and Research Safety Vehicles Development; Panel discussion on the ESV program with special regard to smaller vehicles; Frontal crash protection, restraint systems development, Seats; Biomechanics, Dummies; Side impact protection; Accident analysis and pedestrian protection; Accident avoidance, handling and stability, braking; and Panel discussion on safety, energy conservation and emissions.

513,848
PB85-140085/GAR PC **A99/MF A01**
National Highway Traffic Safety Administration, Washington, DC.
International Technical Conference on Experimental Safety Vehicles (7th) Held at Paris, France on June 5-8, 1979.
Dec 79, 1080p DOT-HS-805 199
See also PB85-140010.

Contents: Award presentations; Government status reports; Industry status reports; Panel discussion on the Experimental Safety Vehicle program; Frontal crash protection and passive restraint development; Biomechanics and dummy development; Side impact protection; Accident investigation and data analysis; Pedes-

trian protection; Braking, handling and stability; and Panel discussion on intentions for rulemaking.

513,849
PB85-854321/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Automotive Aerodynamics. 1973-January 1985 (Citations from Information Services in Mechanical Engineering Data Base).
Rept. for 1973-Jan 85.
Jan 85, 63p
Supersedes PB84-857432. Prepared in cooperation with Cambridge Scientific Abstracts, Washington, DC.

This bibliography contains citations concerning aerodynamic design considerations in automotive engineering. Topics include techniques for reducing drag for fuel economy, wheel design, vehicle interior noise, and wind tunnel test analyses. Passenger, commercial, and racing vehicles are considered, with particular emphasis on tractor/trailer wind deflectors. (This updated bibliography contains 95 citations, 11 of which are new entries to the previous edition.)

513,850
PB85-854750/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Motorcycle Safety, Environmental Effects, and Performance Studies. 1970-January 1985 (Citations from the NTIS Data Base).
Rept. for 1970-Jan 85.
Jan 85, 166p
Supersedes PB83-804252.

This bibliography contains citations concerning a variety of aspects regarding motorcycle utilization. Topics include safety equipment and education, vehicle emmisions, environmental effects of off-road use, visibility factors, and vehicle design. Considerable attention is given to accident prevention strategies, and the impact of crash helmet use. Motorcycle operator training programs are discussed. Vehicles designed for off-road use and highway driving are considered. (This updated bibliography contains 192 citations, 15 of which are new entries to the previous edition.)

13H. Industrial Processes

513,851
AD-A148 682/8/GAR PC **A05**/MF **A01**
Rockwell International, Thousand Oaks, CA. Electronics Research Center.
Ion Implanted GaAs I.C. Process Technology.
Quarterly technical rept. no. 7, 1 Jan-31 Mar 79,
R. Zucca, S. I. Long, F. H. Eisen, R. C. Eden, and B. M. Welch. Jun 79, 98p Rept no. SC5110.16QR
Contract F49620-77-C-0087, ARPA Order-3384
Prepared in cooperation with Crystal Specialties, Inc., California Inst. of Technology and Cornell Univ.

This report covers the second quarter, Phase II of a program on ion implanted planar GaAs (gallium arsenide) integrated circuit technology. The overall objective of this program is the development of a manufacturable process for high-speed low-power GaAs logic circuits. The goal for Phase I was to establish the technology, and demonstrate its viability by fabricating circuits reaching MSI complexity. The goal for Phase II is to achieve the capability of fabricating GaAs ICs of LSI complexity. The most important result in this quarter was the successful demonstration of an 8:1 data multiplexer and a 1:8 data demultiplexer operating at clock rates as high as 1.1 GHz. In addition, operation of 8 circuits has been observed at frequencies as high as 1.9 GHz. Thus, the design objective for the operating speed of these demonstration circuits has been achieved.

513,852
AD-A148 804/8/GAR PC **A05**/MF **A01**
BDM Corp., Vienna, VA.
Electromagnetic Processing of Materials.
Technical rept. 6 Feb-17 Aug 84,
G. B. Taggart. 17 Aug 84, 89p Rept no. BDM/W-84-0527-TR
Contract MDA903-84-C-0039, Grant DARPA Order-4114

This report examines the potential for using electromagnetic radiation (microwaves) in the processing of materials. The feasibility of enhancing the coupling of incident microwave energy for materials processing is investigated with emphasis on ordinarily low-loss materials, e.g., polymers. A review is made of the coupling of electromagnetic radiation to nonconductive solids. The mechanisms for coupling microwaves to these solids are identified and variables which can influence dielectric loss are reviewed. A survey of the literature on microwave processing of materials is given. Finally, a discussion is presented on modifying materials so as to enhance coupling.

513,853
AD-A148 828/7/GAR PC **A11**/MF **A01**
Army Industrial Base Engineering Activity, Rock Island, IL.
Manufacturing Methods and Technology Program Plan, CY 1984.
Annual rept.,
G. Fischer. Sep 84, 232p SBI-AD-E700 011

No abstract available.

513,854
DE85000308/GAR PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Chemically Amplified Laser Direct-Writing of Aluminum.
J. Y. Tsao, and D. J. Ehrlich. 1984, 3p SAND-84-1949C, CONF-841157-12
Contract AC04-76DP00789
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1984.
Portions are illegible in microfiche products.

Laser microchemical direct writing has important advantages over other techniques for the deposition of thin-film patterns. Disadvantages, however, are lower throughput and the need to suppress competing processes such as gas-phase nucleation of particles or substrate damage. Therefore, it is of interest to investigate methods for increasing the overall speed of laser direct-writing by microchemistry. Recently, a growing class of laser-deposition techniques has emerged in which laser radiation is used only to enhance or to impede the initial nucleation of a thin film. In general, it is convenient to draw a distinction between nucleation barriers due to physical effects and those due to chemical effects. The first type of barrier is derived from surface tension. The laser deposits a pattern of heterogeneous catalyst to initiate a subsequent transformation that is chemically self-sustaining or autocatalytic. This paper summarizes experimental work on an example of the second type, in which the laser direct writing of patterned thin films of Al is chemically amplified by subsequent selective pyrolytic chemical vapor deposition. (ERA citation 10:003073)

513,855
DE85000458/GAR PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Laser-Plasma Interactions for the Deposition and Etching of Semiconductor Materials.
P. J. Hargis, and J. M. Gee. 1984, 25p SAND-84-1926C, CONF-8405251-1
Contract AC04-76DP00789
Annual plasma seminar, Palo Alto, CA, USA, 21 May 1984.
Portions are illegible in microfiche products.

Laser-plasma chemical processing is a versatile materials processing technique in which an ultraviolet laser and a glow discharge are both required in order for deposition or etching to occur on semiconductor substrates. This new materials processing technique has been used to both deposit and etch semiconductor materials on a number of substrates. Recent results have demonstrated that laser-plasma chemical processing can also be used to deposit epitaxial silicon films on single-crystal silicon wafers. Laser Raman spectroscopy, transmission electron microscopy, and scanning electron microscopy were used to characterize the deposited and etched films. Results obtained to date have been interpreted in terms of a mechanism which involves the interaction of the incident ultraviolet-laser radiation with a plasma-deposited adlayer on the irradiated substrate. (ERA citation 10:002794)

513,856
N85-12127/5/GAR PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Influence of Aluminum Oxide Film on Thermocompression Bonding of Gold Wire to Evaporated Aluminum Film.
S. Iwata, A. Ishizaka, and H. Yamamoto. Oct 84, 25p NAS 1.15:77503, NASA-TM-77503
Contract NASW-3541
Transl. into English from Nippon Kinzoku Gakkaishi (Japan), V. 45, No. 6, 1981 p 603-609. Transl. by Kanner (Leo) Associates, Redwood City, CA. Original Document Prep. by Hitachi Ltd., Kokubunji, Japan.

The influence of Al surface condition on the thermocompression bonding of Au wires to Al electrodes for integrated electric circuits was studied. Au wires were connected to Al electrodes by nail-head bonding after various Al surface treatments. Bonding was evaluated by measuring the wire pull strength and fraction of the number of failures at Au-Al bonds to the total number of failures. Dependence of the fraction on applied load was derived theoretically with a parameter named critical load to take into consideration the differences in Al surface condition. The relation also held explicately for various surface treatments. Characterization of the Al surface was carried out by electron microscopy for chemical analysis.

513,857
N85-12201/8/GAR PC **A05**/MF **A01**
Heli (Rudolph), Kiel (Germany, F.R.).
Fast and Precise Processing of Material by Means of an Intensive Electron Beam.
Final Report, Dec. 1982.
S. Beisswenger. Jul 84, 85p BMFT-FB-T-84-123
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

For engraving a picture carrying screen of cells into the copper-surface of gravure cylinders, an electron beam system was developed. Numerical computations of the power density in the image planes of the electron beam determined the design of the electron optical assembly. A highly stable electron beam of high power density is generated by a ribbon-like cathode. A system of magnetic lenses is used for fast control of the engraving processes and for dynamic changing of the electron optical demagnification. The electron beam engraving system is capable of engraving up to 150,000 gravure cells per sec.

513,858
N85-12341/2/GAR PC **A03**/MF **A01**
General Electric Co., Schenectady, NY.
Laser Balancing System for High Material Removal Rates.
Final Report.
M. G. Jones, G. Georgalas, and A. L. Ortiz. Oct 84, 28p NAS 1.26:174731, REPT-84-SRD-042, NASA-CR-174731
Contract NAS3-22814

A laser technique to remove material in excess of 10 mg/sec from a spinning rotor is described. This material removal rate is 20 times greater than previously reported for a surface speed of 30 m/sec. Material removal enhancement was achieved by steering a focused laser beam with moving optics to increase the time of laser energy interaction with a particular location on the circumferential surface of a spinning rotor. A neodymium:yttrium aluminum garnet (Nd:YAG) pulse laser was used in this work to evaluate material removal for carbon steel, 347 stainless steel, Inconal 718, and titanium 6-4. This technique is applicable to dynamic laser balancing.

513,859
N85-12608/4/GAR PC **A04**/MF **A01**
Maschinenfabrik Augsburg-Nuernberg A.G., Augsburg (Germany, F.R.).
Development of a Modular Multicoordinate Measuring System with Continuous-Path Microprocessor Control.
Final Report, Oct. 1981.
E. Schmeer, and W. Schmatz. Jul 84, 57p BMFT-FB-T-84-158
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

A four axis coordinate gauging machine was developed. A pump wheel and a metal fitting were measured. Continuous-path control allows orthogonal contact whatever position the surface of the workpiece is in. The workpiece need not to be lined up. For manual operation, software for user-guidance is available. For automatic operation, programming with NCMES is en-

visaged. The whole system being modular, computers and controls are compatible with gauging machines of different makes.

513,860
PB85-136091/GAR PC E05/MF E01
(Order as PB85-136042/GAR, PC E05/MF E01)
Mitsubishi Electric Corp., Tokyo (Japan).
Automated Test Systems for Use in Engine and Transmission Production,
Y. Omae, K. Nakayama, Y. Yonekura, M. Otsubo, and H. Tokunaga. c1984, 5p
Text in Japanese.
Included in Mitsubishi Denki Giho, v58 n10 p26-30 1984.

Quality assurance for automobile engines and transmission systems is a critically important element of automobile production. Mitsubishi Electric has developed and produced an automated production test system for 100 percent inspection of all components. The article introduces the Corporation's latest technologies for automated test systems, particularly those for automating test equipment, instrumentation, and the data-processing system, along with the test methods.

513,861
PB85-138022/GAR PC E03/MF E03
Office National d'Etudes et de Recherches Aerospatiales, Chatillon-sous-Bagneux (France).
Rapport de Fin de Fabrication de la Demi-Aile Hypersustentee a Fleche Variable (Final Manufacturing Report of the Oversupported Half Wing with Variable Sweep),
J. J. Thibert. Aug 84, 17p TR-25/1736/AY
Text in French.

A mock-up of an oversupported half wing with fixed sweep between 0 and 50 degrees was implemented. This rectangular wing with a 2-m spread and a 40 degree sweep is equipped with an RA 16 SC1 profile. The oversupporting systems are made up of 2 noses and one auxiliary airfoil with variable droop. The controls carried out at various stages of manufacture indicated that the required tolerances had been adhered to.

513,862
PB85-854206/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Assembly Line Techniques. June 1970-January 1985 (Citations from the NTIS Data Base).
Rept. for Jun 70-Jan 85.
Jan 85, 200p
Supersedes PB84-859826.

This bibliography contains citations concerning the procedures involved in improving assembly line efficiency, as well as an analysis of various types of assembly lines and their production techniques. Assembly line balancing, scheduling, design, testing, repair, and computerization is also included. (This updated bibliography contains 224 citations, 114 of which are new entries to the previous edition.)

513,863
PB85-854248/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Soldering Electronics. December 1982-1984 (Citations from the Engineering Index Data Base).
Rept. for Dec 82-1984.
Jan 85, 96p
Supersedes PB84-858281.

This bibliography contains citations concerning the soldering of electronic circuits and circuit boards. Included are solder alloys and fluxes, solder techniques, and testing of soldered joints. Techniques include reflow soldering, wavesoldering, ultrasonic soldering, and special considerations for the heating of the soldering tool. Many citations reference automatic soldering and cleaning, and solder fluxes as to cleanability, wettability, and non-corrosiveness. (This updated bibliography contains 146 citations, 81 of which are new entries to the previous edition.)

513,864
PB85-854412/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Surface Mounting Technology for Electronics Packaging. 1976-January 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1976-Jan 85.
Jan 85, 113p

This bibliography contains citations concerning techniques and technology utilized for surface mounting of a wide variety of electronic components and devices. Assembly methods and economics are considered as well as machinery and equipment used for surface mounted assembly. Some attention is given to the components and devices to be surface mounted. (Contains 135 citations fully indexed and including a title list.)

513,865
PB85-854438/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Computer Vision for Automatic Assembly and Inspection. 1975-1983 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-1983.
Jan 85, 166p

This bibliography contains citations concerning studies and design of equipment and techniques for automatic assembly and inspection in which computer vision plays an integral role. Computer vision in automated visual inspection can be performed even on high speed production lines. Computer vision enables an automated assembly system, such as the manipulators of an industrial robot, to orient the part and to locate the position of the assembly item. The citations reference both the hardware and software components of the computer vision systems. Some citations reference automatic image analysis systems which use computer vision to recognize specific patterns or textures for data collection purposes or for the sorting of parts. (This updated bibliography contains 223 citations, none of which are new entries to the previous edition.)

513,866
PB85-854446/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Computer Vision for Automatic Assembly and Inspection. January 1984-December 1984 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for Jan 84-Dec 84.
Jan 85, 132p
Supersedes PB84-856301.

This bibliography contains citations concerning studies and design of equipment and techniques for automatic assembly and inspection in which computer vision plays an integral role. Computer vision in automated visual inspection can be performed even on high speed production lines. Computer vision enables an automated assembly system, such as the manipulators of an industrial robot, to orient the part and to locate the position of the assembly item. The citations reference both the hardware and software components of the computer vision systems. Some citations reference automatic image analysis systems which use computer vision to recognize specific patterns or textures for data collection purposes or for the sorting of parts. (This updated bibliography contains 155 citations, all of which are new entries to the previous edition.)

513,867
PB85-854628/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Rubber to Metal Bonding. 1973-January 1985 (Citations from the Rubber and Plastics Research Association Data Base).
Rept. for 1973-Jan 85.
Jan 85, 96p
Supersedes PB84-859305.

This bibliography contains citations concerning developments in the technology of adhering elastomers, including natural rubbers, to metal substrates. Bonding agents; including structural, contact, pressure sensitive, and hot melt adhesives; formulations for rubber to metal adhesives, and rubber based adhesives are considered. Testing, performance evaluations, and bonding techniques are also discussed. (This updated bibliography contains 144 citations, 26 of which are new entries to the previous edition.)

513,868
PB85-854636/GAR PC N01/MF N01
National Technical Information Service, Springfield, VA.
Die Forging of Steels and Heat Resistant Alloys. 1966-January 1985 (Citations from the Metals Abstracts Data Base).
Rept. for 1966-Jan 85.
Jan 85, 164p
Supersedes PB84-860766.

This bibliography contains citations concerning the die forging of steels and heat resistant alloys. Applications including forging of aircraft and automobile parts are discussed. The wear of tools and plastic deformation of alloys under working stress are included. The use of die lubricants and various methods of die heating are discussed as are the powder metallurgical techniques employed. (This updated bibliography contains 339 citations, 27 of which are new entries to the previous edition.)

13I. Machinery and Tools

513,869
PB85-135457 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Measurement and Control Model for Adaptive Robots.
Final rept.,
J. S. Albus, A. J. Barbera, M. L. Fitzgerald, R. N. Nagel, and G. J. VanderBrug. 3 Mar 80, 5p
Pub. in Proceedings of International Symposium on Industrial Robots and Exhibition (10th), Milan, Italy, March 5-7, 1980, p35-39.

For robots to operate effectively in the partially unconstrained environments of manufacturing, they must be equipped with control systems that have measurement and sensory capabilities. This paper presents a model for such a system. It consists of parallel control and measurement hierarchies. The control hierarchy decomposes tasks into subtasks, and the measurement hierarchy analyzes data from sensors. At each level the control hierarchy sends expectations to the measurement hierarchy, which returns computed values of the deviation between the observed and expected data. The control hierarchy uses this information to modify its task decomposition strategies so as to generate sensory-interactive goal-directed behavior. The system has been partially implemented on a research robot using a network of microcomputers and a real-time vision system mounted on the robot's wrist.

513,870
PB85-142875 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Hierarchical Control for Robots in an Automated Factory.
Final rept.,
J. S. Albus, C. R. McLean, A. J. Barbera, and M. L. Fitzgerald. 1983, 15p
Sponsored by Society of Mfg. Engineers, Dearborn, MI., Robotics International, Dearborn, MI., and Robot Inst. of America, Dearborn, MI.
Pub. in Proceedings of International Symposium on Industrial Robots and Robots 7 (13th), Chicago, IL., April 17-21, 1983, Volume 2: Future Directions, p13.29-13.43.

A hierarchical architecture for real-time sensory-interactive control of robots, machine tools, inspection machines, and materials transport and inventory systems is described. Computer-aided design, computer-aided process planning, and management information systems make up the top level in the hierarchy where the highest level goals are selected and the longest range planning horizons exist. Commands and goals generated at this highest level are decomposed through a series of levels (SHOP, CELL, WORKSTATION and EQUIPMENT) until at the lowest level there are generated a series of drive signals to individual actuators on robots, machine tools, and other equipments. Feedback from sensors and from the control hierarchy itself are used at all levels to produce real-time goal seeking behavior. Apriori knowledge and sensor data are combined in a world model which is used to generate ex-

pectations and to plan alternate strategies at every level.

513,871

PB85-145514 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Buckling Loads and Natural Frequencies of Drill Bits and Fluted Cutters.
Final rept.,
E. B. Magrab, and D. E. Gilsinn. Aug 84, 9p
Pub. in Jnl. of Engineering for Industry, Transactions ASME 106, p196-204 Aug 84.

The buckling loads, natural frequencies and mode shapes of twist-drill bits and certain fluted cutters under a variety of combinations of twist angle, cross-section geometry and axial loading have been obtained. The drill bit is modelled as a twisted Euler beam under axial loading that is clamped at both ends. The governing system of differential equations is solved by the Galerkin procedure. Explicit forms for the basis functions used to generate the Galerkin coefficients are presented in general form in an appendix. They may be used for obtaining numerical results for that class of problems which use the Rayleigh-Ritz-Galerkin methods with beam-type functions as the basis functions. The representative set of modes obtained exhibit a complex out-of-plane twisting-type motion that suggests a possible explanation for the out-of-roundness of certain drilled holes.

13J. Marine Engineering

513,872

AD-A148 794/1/GAR PC **A11**/MF **A01**
New Hampshire Univ., Durham. Marine Systems Engineering Lab.
Technology Development for Unmanned Untethered Submersible Vehicle Systems.
Final rept. 1 Aug 81-31 Jan 84.
Jun 84, 227p Rept no. 4-21292-84-1-P
Contract N00014-81-C-0756

This document describes a program focused on technologies pacing the development of unmanned untethered submersible vehicle systems. Specifically this program has focused on the objective of an Arctic Inspection Mission System (AIMS). This program was to develop and demonstrate the technology required to perform under-ice mapping of the ocean floor as well as the ice keel employing an untethered autonomous submersible. The areas of technology addressed in this regard were: (1) A sonar sensor array to perform the mapping; (2) An autonomous untethered submersible vehicle system; (3) A method of storing the large amounts of data; (4) Computer requirements to perform this task; and (5) Definition of a navigation system suitable for the AIMS mission. (Author).

513,873

PB85-142883 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Hydrodynamic Drag Versus Roughness for Rotating Disks.
Final rept.,
T. V. Vorburger, F. E. Scire, and E. C. Teague. 1982, 11p
Sponsored by David W. Taylor Naval Ship Research and Development Center, Annapolis, MD.
Pub. in Wear 83, n1-2 p339-349 Dec 82.

The present paper focuses on stylus measurements of the microroughness of rotating disks and their significant correlation with hydrodynamic drag measurements. The roughest disks were found to have drag coefficients that are about 30% greater than those of the smoothest disks. Other surface parameters and functions were measured, however, at the present state of understanding, it seems that knowledge of an amplitude sensitive parameter and a wavelength sensitive parameter is adequate for characterizing increases in the drag of rotating disks due to surface roughness.

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

513,874

PB85-140531/GAR PC **E03**/MF **E03**
Centre Scientifique et Technique de la Construction, Brussels (Belgium).
Recommandations pour l'Utilisation des Tubes en Cuivre pour la Distribution d'eau Sanitaire Chaude et Froide (Recommendations for the Use of Copper Tubing for the Distribution of Domestic Cold and Hot Water).
c1984, 21p NOTE D'INFORMATION TECHNIQUE-154
Text in French, summaries in Dutch, German, and English.

Contents:
- Behaviour of copper in service;
- Recommendations for the use of copper;
- Tubing:
  - quality of the tubing, water which may be transported, design and execution of the distribution systems, placing of the tubes;
  - Recommendations concerning the use of the distribution systems;
- Table summarizing the recommendations.

513,875

PB85-142461 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Automated Pressure Regulator.
Final rept.,
M. Waxman, H. A. Davis, M. Horowitz, and B. Everhart. Sep 84, 4p
Contract DOE-EA-77-A-01-6010
Pub. in Review of Scientific Instruments 55, n9 p1467-1470 Sep 84.

A pressure regulator has been constructed that automatically nulls a sensitive differential pressure indicator of the type used in high-quality PVT experiments, thus permitting at least partial automation of such experiments. Distinguishing features are: high resolution, sufficient rigidity for operation in a pressure range up to 100 MPa, and a control logic that permits nulling of the pressure transducer even if the initial state is very far from balance.

513,876

PB85-854644/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Underwater Pipelines. 1973-January 1985 (Citations from FLUIDEX Data Base).
Rept. for 1973-Jan 85.
Jan 85, 190p
Supersedes PB84-852557.

This bibliography contains citations concerning the planning, design, fabrication, construction, and quality control of submarine pipelines, chiefly for oil and gas transmission. Submarine pipeline protection, inspection, repair, and pipe laying equipment are also discussed. Coverage is worldwide. (This updated bibliography contains 313 citations, 81 of which are new entries to the previous edition.)

13L. Safety Engineering

513,877

PB85-134997/GAR PC **A04**/MF **A01**
Westat, Inc., Rockville, MD. Research Div.
Design of the New York State Seat Belt Usage Survey.
Final rept.,
J. M. Brick, and H. J. Edmonds. Nov 84, 65p
Contract DTNH22-83-C-07267

This report describes the sample design for the survey of the seat belt usage rate in New York State. It explains the sampling of areas of land in the State and roads within these sampled areas which makes it possible to obtain estimates of the usage rate across the State. The sampling across time of day and day of week is discussed in conjunction with the sampling of locations. The sample design is a multistage one with frequent use of stratification and clustering. Procedures for processing the data so that estimates of the usage rate and an estimate of its reliability are presented. Cost models employed in the design are provided and methods to analyze the survey results to improve some of the estimated parameters are proposed.

513,878

PB85-135838/GAR PC **E06**/MF **E01**
Ontario Ministry of Municipal Affairs and Housing, Toronto.
Residential Fire Statistics in Ontario by Settlement and Building Type,
A. Zdanowicz, S. Chong, and C. Goodman. Aug 84, 102p ISBN-0-7743-9879-5

The report is an analysis of recorded fire incidence in the Province of Ontario for a brief sample period of one year 1981. This review deals mainly with fire incidence in residential buildings with some comparative figures for non-residential buildings and non-building related fires to keep within an overall perspective. The residential sector is examined more specifically within five generic building types and five settlement sizes. In an effort to gain insight into any particular trends in fire incidents and their severity in residential buildings, classifications initiated by the Office of the Fire Marshal were used together with household information as provided by Ontario 1981 Census of Canada.

513,879

PB85-138444/GAR PC **E05**/MF **E05**
Transport and Road Research Lab., Crowthorne (England).
Accidents at 4-Arm Roundabouts.
Laboratory rept.,
G. Maycock, and R. D. Hall. c1984, 67p TRRL/LR-1120
Prepared in cooperation with Southampton Univ. (England).

The report gives the findings of a study of personal injury accidents at a sample of 84 four-arm roundabouts on main roads in the UK. The study includes small roundabouts and roundabouts of conventional design, in both 30-40 and 50-70 mile/h speed limit zones. Tabulations are given showing accident frequencies, severities, and rates by roundabout type. The accidents are further analyzed by type (entering-circulating, approaching, single-vehicle, etc) and by road-user involvement (cyclist, motorcyclist, pedestrian, etc). The accident frequencies by type are related to traffic flow and roundabout geometry using regression methods. Equations are developed to enable roundabout accidents to be predicted for use in design and appraisal. The report illustrates the features of the prediction model, and includes a discussion of prediction errors. (Copyright (c) Crown Copyright 1984.)

513,880

PB85-138568/GAR PC **A06**/MF **A01**
Michigan Univ., Ann Arbor. Transportation Research Inst.
Occupant Protection Public Information Materials Catalog Number 6.
Rept. for 1 Jul 83-30 Jun 84,
A. C. Grimm, and M. Siegel. Jun 84, 106p UMTRI-84-23, DOT-HS-806 597
Contract DOT-HS-9-02209
Supersedes PB84-157924.

The Occupant Protection Public Information Materials Catalog is designed for use by persons developing public information programs on adult and child restraint systems. It lists materials produced for campaigns, along with journal articles and reports describing and evaluating such programs. Materials and reports listed in the catalog may be borrowed free of charge.

513,881

PB85-139616/GAR PC **A02**/MF **A01**
National Highway Traffic Safety Administration, East Liberty, OH. Vehicle Research and Test Center.
Child Seat Retention Tests.
Final rept. Mar-Apr 84,
R. C. Esser. Apr 84, 19p RD-284-3, DOT-HS-806-629

Static tests and two sled tests were performed using a Century 200 child seat mounted in the rear center position of a 1982 Plymouth Gran Fury using General Motors seat belts. These tests were performed to determine whether the belt will hold the child seat under various load conditions. The purpose of the static tests was to determine the most failure prone belt/buckle interface angle and to determine belt/buckle interaction under low G load conditions.

513,882
PB85-141869 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Control Units for Intrusion Alarm Systems.
Final rept.,
M. L. Kile, M. Juberts, G. N. Stenbakken, and D. E. Frank. Jun 84, 15p
Sponsored by National Inst. of Justice, Washington, DC.
Pub. in NIJ (National Inst. of Justice) Standard-0321.00, 15p Jun 84.

This standard establishes performance requirements and test methods for intrusion alarm control units used in protecting residential or commercial premises. Upon actuation of an intrusion sensing device or the detection of a trouble condition, the control unit may initiate a local audible alarm, transmit an alarm signal to a police department, or transmit an alarm signal to a central station. The performance characteristics addressed are those that affect the reliability of the device with emphasis on those that affect false alarms susceptibility and tamper resistance.

513,883
PB85-143964 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Assessment of Fire Induced Flows in Compartments.
Final rept.,
J. G. Quintiere, K. Steckler, and D. Corley. 1984, 14p
Pub. in Fire Prevention Science and Technology 4, n1 p1-14 1984.

An experimental study was conducted to measure flow rates of air and fire products through wall vents, namely windows and doors. A burner (diffusion flame) was used to simulate a line fire of various heating rates and line widths along a wall of the enclosure. Analysis of the data showed the temperatures followed a two-layer profile with both upper and lower average gas temperatures correlated by dimensionless groups. Estimates of vent mixing rates into the lower layer and estimates of wall vertical boundary layer flows were made. The former were up to 30 per cent of the vent flow rate and the latter were up to 100 per cent of the vent flow rate. This estimate for the wall flows appears high due to inconsistencies in the analysis. The primary result shows that a prediction, based on a two-layer (hot and ambient) model with only plume entrainment manifesting flow between the layers, gives results to within 50 per cent of the experimental vent flows.

513,884
PB85-148153 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Thermal Actuation of Extinguishing Systems.
Final rept.,
D. D. Evans. 1984, 14p
See also PB84-177146.
Pub. in Combustion Science and Technology 40, p79-92 1984.

A brief review of the Response Time Index (RTI) method of characterizing the thermal response of commercial sprinklers and heat detectors is presented. Measured ceiling layer flow temperature and velocity histories from a bedroom fire test are used to illustrate the use of RTI in calculating sprinkler operation times. In small enclosure fires, a quiescent warm gas layer confined by the room walls may accumulate below the ceiling before sprinkler operation. The effects of this warm gas layer on the fire plume and ceiling-jet flows are accounted for by substitution of an equivalent point source fire. Relationships are given for the location and strength of the substitute source relative to a point source representation of the actual fire. Encouraging agreement was found between measured ceiling-jet temperatures from steady fires in a laboratory scale cylindrical enclosure put into dimensionless form based on parameters of the substitute fire source, and existing empirical correlations from fire tests in large enclosures in which a quiescent warm upper gas layer does not accumulate.

13M. Structural Engineering

513,885
AD-A148 717/2/GAR PC **A04/MF A01**
Daedalean Associates, Inc., Woodbine, MD.
Feasibility Investigation of Utilizing the Internal Friction Damping Nondestructive Evaluation Technique (IFD-NDE) for Measuring the Degree of Fatigue in Mobile Bridge Structures.
Technical rept.,
R. S. Weinreich. Nov 84, 56p Rept no. DAI-RSW-8409-001-TR
Contract DAAK70-84-C-0030

This report discusses a nondestructive test technique which has the potential for measuring the degree of fatigue in military bridge structures. The physical property that is monitored in IFD-NDE is the rate at which an energy impulse imparted to a material or structure decays due to the internal friction of the material. A change in rate of decay reflects changes in the basic chemical and/or mechanical properties of the material due to an accumulation of subtle material variables. These material variables include grain size, chemical compositions, interstitial elements, dislocations, precipitate particles, strain rate effects, etc. It has been shown in some materials to be possible to predict the remaining fatigue life before failure occurs by proper monitoring of the accumulation of these variables. This program sought to adapt the IFD-NDE technique to military bridges by first identifying the characteristic damping coefficient versus fatigue life curve for bar specimens of the materials used in bridges. Results generally show that for 6061 and 7075 aluminum alloys, the damping coefficient remains fairly constant until a point of approximately 30% remaining material life where a noticeable spike occurs in the data. Afterwards the damping coefficient returns to a nominal value. For the 7005 aluminum alloy, no correlation was found between the remaining fatigue life and damping capacity.

513,886
AD-A148 821/2/GAR PC **A03/MF A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Durability and Behavior of Prestressed Concrete Beams. Report 6. Posttensioned Concrete Beam Investigation, Supplemental Laboratory Tests of Beams Exposed from 1961 to 1982.
Technical rept.,
E. F. O'Neil, and G. L. Odom. Oct 84, 46p Rept no. WES-TR-6-570-6
See also Rept. no. WES-TR-6-570-4, AD-A038 444.

This report is the sixth in a series describing a study being conducted to develop information on the durability of prestressed concrete beams. This phase of the study is concerned with field and laboratory testing and with observation of posttensioning systems including end anchorages, end anchorage protection, posttensioning conduit, and posttensioning wires. In June 1961, 20 air-entrained, posttensioned concrete beams were placed at the Treat Island, Maine, exposure station. The beams were fabricated using four different types of posttensioning systems with 12 different types of end anchorage protection over external and flush anchorages. End anchorage protection was attached to the beams using six different types of joint preparation: bush-hammering, epoxy adhesive on sandblasted surface, retarding agent, sandblasted, sandblasted with primer, and no preparation. The end protections were made from three different mixtures: portland-cement concrete, epoxy concrete, and sand mortar. Eight beams were returned to the Waterways Experiment Station (WES) for autopsy and testing in September 1973 and December 1974. These beams were tested to determine the effects of severe environment described above on the posttensioning system. In January 1983, three more beams were returned to WES from Treat Island for autopsy and additional testing. The results of these additional tests are the subject of this investigation. If no further tests are made on the nine posttensioned beams that remain at Treat Island, this report will be the final report in the series.

513,887
DE85900135/GAR PC **A02/MF A01**
Institute of Nuclear Energy Research, Lung-Tan (Taiwan). Technical Information Center.
Graphic Display of Structural Model Using SAP6/7.
H. M. Pan. Nov 82, 25p INER-0480
U.S. Sales Only. Portions are illegible in microfiche products.

Graphic display of structural model is very important to structural analyst. The powerful FACOM M-200 computer available to INER does not have the plotting capability yet. This report describes a procedure to use CDC graphic devices to display structural model on FACOM computer using SAP6/7 package. (ERA citation 10:001692)

513,888
PB85-135879/GAR PC **A99/MF E03**
New Mexico Univ., Albuquerque. Coll. of Engineering.
International Workshop: Earthen Buildings in Seismic Areas. Conference Proceedings. Volume 1,
G. W. May. Sep 81, 695p AID-PN-AAL-333-1
See also PB85-135887. Text in Spanish and English. Sponsored by National Science Foundation, Washington, DC., and Appropriate Technology International, Washington, DC. Proceedings of the International Workshop held at the New Mexico Univ., Albuquerque, on May 24-28, 1981. Prepared in cooperation with Intertect, Dallas, TX.Portions of this document are not fully legible.

Earthen buildings are traditionally constructed since prehistoric times in all parts of the world. Yet there is practically no standardization attempted so far. As usually constructed, they are weak and most vulnerable to complete collapse as observed during earthquakes in the past. An attempt has been made here to identify the main defects and structural weaknesses in such constructions. Then suggestions are given to improve their behavior under normal conditions and to increase their resistance to earthquakes. It is recognized that no test results are yet available to evaluate such recommendations. The need to carryout properly planned investigations is therefore emphasized.

513,889
PB85-135887/GAR PC **A22/MF A01**
New Mexico Univ., Albuquerque. Coll. of Engineering.
International Workshop: Earthen Buildings in Seismic Areas. Conference Proceedings. Volume 2,
G. W. May. Sep 81, 520p AID-PN-AAL-333-2
See also PB85-135879, and PB85-135895. Text in Spanish and English. Sponsored by National Science Foundation, Washington, DC., and Appropriate Technology International, Washington, DC. Proceedings of the International Workshop held at the New Mexico Univ., Albuquerque, on May 24-28, 1981. Prepared in cooperation with Intertect, Dallas, TX.Portions of this document are not fully legible.

Contents:
Social, Economic, and Cultural Aspects;
Implementation;
Codes, Specifications, and Standards.

513,890
PB85-135895/GAR PC **A07/MF A01**
New Mexico Univ., Albuquerque. Coll. of Engineering.
International Workshop: Earthen Buildings in Seismic Areas. Conference Report, Research Needs and Priorities. Volume 3,
F. C. Cuny, and G. W. May. Sep 81, 128p AID-PN-AAL-333-3
See also PB85-135887. Sponsored by National Science Foundation, Washington, DC., and Appropriate Technology International, Washington, DC. Prepared in cooperation with Intertect, Dallas, TX. Proceedings held at the New Mexico Univ., Albuquerque, May 24-28, 1981.

The scope covers five primary topic areas: Subject Area 1 - Structures; Subject Area 2 - Materials; Subject Area 3 - Social, Economic and Cultural Aspects; Subject Area 4 - Program Implementation; Subject Area 5 - Codes, Specifications and Standards.

513,891
PB85-136711/GAR PC **A12/MF A01**
Texas Univ. at Austin. Center for Transportation Research.
Proposed Design Procedures for Shear and Torsion in Reinforced and Prestressed Concrete.
Research rept.,
J. A. Ramirez, and J. E. Breen. Nov 83, 273p CTR-3-5-80-248-4F, FHWA/TX-84/38+248-4F
Sponsored by Texas State Dept. of Highways and Public Transportation, Austin.

The object of this study is to propose and evaluate a design procedure for shear and torsion in reinforced and prestressed concrete beams, with the aim of clarifying and simplifying current design requirements and AASHTO requirements. In previous reports in this series a three-dimensional space truss model with variable angles of inclination of the diagonals was introduced as a design model and shown by comparison

with test data to be a conservative yet more accurate model than current ACI/AASHTO design approaches. The general nature of this variable angle truss model makes it extremely useful to the designer in treating complex shear and torsion problems. Several examples of such applications are included in this report. Specific recommendations for incorporating such models are presented in language and expressions consistent with the type of language used in AASHTO Bridge Specifications.

513,892
PB85-137636/GAR PC **A02**/MF **A01**
New York State Dept. of Transportation, Albany. Engineering Research and Development Bureau.
Failure Test of a Jack-Arch Bridge.
Interim research rept.,
D. B. Beal. Feb 84, 25p RR-110, FHWA/NY/RR-84/110

A 47-ft jack-arch bridge was loaded to failure to determine the degree of composite action between the steel beams and their concrete encasement. Measurements included strain in the top and bottom flanges of the beams, midspan deflection of all beams, and end rotation of two beams. Despite the lack of shear connectors, the beam flange strain data demonstrated that the full composite section was active in resisting load.

513,893
PB85-138691/GAR PC **A14**/MF **A01**
Texas Univ. at Austin. Center for Transportation Research.
Experimental Verification of Design Procedures for Shear and Torsion in Reinforced and Prestressed Concrete.
Research rept.,
J. A. Ramirez, and J. E. Breen. Nov 83, 325p CTR-3-5-80-248-3, FHWA/TX-84/37+248-3
Sponsored by Texas State Dept. of Highways and Public Transportation, Austin.

The object of this study is to propose and evaluate a design procedure for shear and torsion in reinforced and prestressed concrete beams, with the aim of clarifying and simplifying current design requirements and AASHTO requirements. This report summarizes an extensive experimental verification of a powerful three-dimensional space truss model with variable angle of inclination of the diagonal elements. This conceptual model was developed by European and Canadian engineers over the past fifteen years. The model is shown to be a conservative method of predicting the strength of such members under combined loading. Detailed comparison with current ACI/AASHTO procedures indicate greatly reduced scatter when comparisons are made to test results. Detailed design procedures and specifications, and example applications are given in the final report in this series.

513,894
PB85-139095/GAR PC **E03**/MF **E03**
Cambridge Univ. (England). Dept. of Engineering.
Analysis and Design of Pile Groups Using a Microcomputer,
M. F. Randolph. 1984, 11p CUED/D-SOILS/TR-158

The paper outlines briefly the theoretical background to approximate solutions for the axial, lateral and torsional response of piles, and describes how they may be used in a computer program, PIGLET, for the analysis of pile groups under general loading conditions. Currently, a FORTRAN program, originally written for a mainframe computer, has been adapted to take advantage of the greater interactive facilities available with a microcomputer. The paper gives details of the program size and typical run times for different sizes and complexity of problem, and compares the results with those from more rigorous numerical solutions, based on boundary integral techniques.

513,895
PB85-139160/GAR PC **A09**/MF **A01**
Texas Univ. at Austin. Center for Transportation Research.
Review of Design Procedures for Shear and Torsion in Reinforced and Prestressed Concrete.
Research rept.,
J. A. Ramirez, and J. E. Breen. Nov 83, 200p CTR-3-5-80-248-2, FHWA/TX-84/36+248-2
Sponsored in part by Texas State Dept. of Highways and Public Transportation, Austin.

The object of this study is to propose and evaluate a design procedure for shear and torsion in reinforced and prestressed concrete beams, with the aim of clarifying and simplifying current design provisions and AASHTO standard specifications. This report summarizes an extensive literature review which documents the development of present regulations and procedures. In addition, the report outlines the general background and derivation of a powerful three-dimensional space truss model with variable angle of inclination of the diagonal elements. This conceptual model was developed by European and Canadian engineers over the past 15 years. The model is shown to be a plasticity lower bound solution which matches the upper bound solution. Thus the model is a mathematically valid solution which represents the failure load. Extension of the use of this model into a design procedure is outlined. Experimental verification, detailed design procedures and specifications, and example applications are given in later reports in this series.

513,896
PB85-144020 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Multidirectional Analysis of Extreme Wind Speed Data.
Final rept.,
E. Simiu, E. M. Hendrickson, W. A. Nolan, I. Olkin, and C. H. Spiegelman. Aug 84, 4p
Sponsored by National Science Foundation, Washington, DC.
Pub. in Proceedings of Engineering Mechanics Division Specialty Conference (5th), Laramie, WY., August 1-3, 1984, Eng. Mech. Civ. Eng. 2, p1196-1199 Aug 84.

An extended abstract is presented in which: (1) Existing methods for taking wind directionality into account in structural engineering calculations are reviewed; (2) A new such method is proposed; (3) It is shown that published data issued by the National Oceanic and Atmospheric Administration are sufficient to characterize the directional extreme wind climate.

513,897
PB85-144939 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Dynamic Response of Structural Systems Subjected to Horizontal Propagating Shear Waves.
Final rept.,
S. T. Wu, and E. V. Leyendecker. Jul 84, 8p
Pub. in Proceedings of World Conference on Earthquake Engineering (8th), San Francisco, CA., July 21-28, 1984, p355-362.

This paper presents the numerical results of a parametric study for structures subjected to shear horizontal propagating waves. Dynamic behavior of coupled lateral-torsional systems subjected to seismic excitations is investigated analytically. Case studies are provided to show the contribution of each of the selected parameters to the rotational response of the system. Dynamic eccentricity is selected as an index to represent the level of the response. The dynamic characteristics of the systems and motions are also discussed based on this proposed approach.

513,898
PB85-144947 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Some Statistical Aspects of Wind and Snow Loading.
Final rept.,
R. B. Corotis, and B. R. Ellingwood. Aug 84, 4p
Pub. in Proceedings of Engineering Mechanics Division Specialty Conference (5th), University of Wyoming, Laramie, WY., August 1-3, 1984, p1200-1203.

Economic loss due to natural hazards in the United States is well in excess of ten billion dollars a year. However, research into improved probabilistic modeling of these hazards, and structural advances to limit the loss, attract only relatively small support outside the earthquake engineering community. This paper discusses some particular probabilistic modeling aspects of two widespread hazards; wind and snow.

14. METHODS AND EQUIPMENT

14B. Laboratories, Test Facilities, and Test Equipment

513,899
AD-A148 600/0/GAR PC **A03**/MF **A01**
Clemson Univ., SC. Dept. of Chemical Engineering.
Laboratory Simulation of Smoke Reduction from Aircraft Engine Test Cell Exhaust Using a Fluidized Bed Filter.
Final rept. 1 Jun 83-31 Aug 84,
R. W. Rice. 22 Oct 84, 37p AFOSR-TR-84-1078
Grant AFOSR-83-0147

The lowering of aircraft engine test cell exhaust opacity by fluidized bed filtration of soot was simulated in the laboratory. Smoke from a diesel burner was diluted with ambient air and passed through a 25 cm diameter cylindrical bed of either 500 or 1000 micron glass spheres. Bed depths ranging from 2.5 to 10 cm and superficial gas velocities of 2 to 60 cm/s were studied. Using separate light-sources and photocell detectors, the optical densities of the bed inlet and outlet gas streams were simultaneously monitored. From these data percentage opacity reduction (POR) values were determined as a function of time. This measure of filtration efficiency was found to increase with bed depth, ranging from roughly 50% for a 2.5 cm deep bed of 1100 micron glass beads to 99% for a 10 cm deep bed of 500 micron beads. No appreciable decline in effectiveness was observed for periods of up to 1.5 hours. Attempts were made to supplement POR results with gravimetric measurements of particle loading and size distribution made using a stack gas sampler (inertial impactor).

513,900
AD-A148 611/7/GAR PC **A05**/MF **A01**
Pennsylvania State Univ., State College. Applied Research Lab.
Inflow Ducting in High-Volume-Flow Subsonic Anechoic Chambers.
Technical memo.,
L. R. Quartararo. 12 Oct 83, 95p Rept no. ARL-TM-83-177
Contract N00024-79-C-6043

When studying the aeroacoustic performance of fluid moving machinery, spacial and temporal disturbances in the supply flow may induce otherwise nonexistent noise characteristics in the test device. To control these incoming disturbances, inlet screens, honeycombs, and other wind tunnel configurations have been used. To investigate whether an aeroacoustic test facility could be designed which would utilize neither a wind tunnel configuration nor an inlet control structure at the test device inlet, a one-sixth-scale model of a proposed high-volume-flow subsonic anechoic chamber was evaluated. An experimental investigation of inlet-flow controlling walls with combined anechoic and aerodynamic capabilities was carried out. Aerodynamic performance was measured in the plane of a proposed test fan rotor. Data from several inlet wall configurations give guidance in the design of inflow ducting configurations for high-volume-flow subsonic anechoic chambers. The results indicate that substantial reduction of axial turbulence intensities and steady-state spacial disturbances can be achieved without degradation of the anechoic capability of the inlet wall. Because inflow control is no longer needed near the test device inlet, the acoustical characteristics of the test device should match those of a free-field device.

513,901
AD-A148 618/2/GAR PC A02/MF A01
Westinghouse Research and Development Center, Pittsburgh, PA.
Monitoring Cure of Epoxy Resins Using a Microdielectrometer.
Technical rept. no. 1, Feb 82-Jan 84,
Z. N. Sanjana, and R. L. Selby. Sep 84, 22p Rept no. 9871-CURES-R1
Contract N00014-82-C-0164

Microdielectrometry is a recent advancement in monitoring the cure of resins using dielectric techniques. It utilizes a solid state chip roughly .075 in. x .075 in. as the probe, and has on-chip amplification of the signal which permits interrogation of the material at frequencies as low as 1 Hz. This paper discusses cure monitoring of resins utilizing microdielectrometry and compares the technique and instrumentation to conventional dielectrometry. Data on an anhydride cured system and an aromatic amine cured system cured under isothermal and temperature variant conditions are presented. Results show that microdielectrometry can be used to follow cure of epoxy resins. Absolute measurements of permittivity and loss factor can be made and they provide information on the mechanisms that produce the observed changes. The present packaging of the chip is unsuitable for use with composites.

513,902
AD-A148 619/0/GAR PC A02/MF A01
Westinghouse Research and Development Center, Pittsburgh, PA.
Use of Microdielectrometry in Monitoring the Cure of Resins and Composites.
Technical rept. no. 2, Jan-Jul 84,
Z. N. Sanjana. Sep 84, 23p Rept no. 9871-CURES-R2
Contract N00014-82-C-0164

As thermosetting resins and composites made from them begin to be used in critical applications, it becomes necessary to monitor and analyze the cure of the resin within the confines of the processing equipment. Such measurements have been carried out using a dielectric technique called dielectrometry or dielectric analysis. Conventional dielectrometry has certain limitations associated with the use of parallel plate geometry for electrodes. For in situ measurement of cure, intrusiveness, of electrodes is a problem which may require placement of electrodes in non-strategic areas. Since electrode spacing changes during cure, it is difficult to deduce permittivity and loss factor from the data. One approach to overcome the problems described above is the development of microdielectrometry. The electrode geometry does not change, therefore loss factor and permittivity data can be deduced in real-time. Results on an aromatic amine cured epoxy resin and a dicyandiamide cured epoxy resin prepreg are presented in this report.

513,903
AD-A148 684/4/GAR PC A05/MF A01
Spectron Development Labs., Inc., Costa Mesa, CA.
Development of Holographic Particle Field Data Reduction by Fourier Analysis.
Final rept. 13 Feb-13 Oct 84,
J. D. Trolinger, and C. F. Hess. 14 Aug 84, 96p SDL-84-2338-03F, AFWAL-TR-84-2091
Contract F33615-83-C-2372

The purpose of this work is to establish the feasibility of using a Fourier transform analysis to automatically extract size distribution from particle field off-axis holograms. Both experimental and theoretical studies were conducted to show that this technique is feasible. A holographic system was designed and built compatible for use with a commercially available Fourier transform analyzer and software. Holograms of a standard particle field were obtained, and scattered light of both the particle field and its hologram were Fourier transform analyzed. The Sauter mean diameter determined by the two methods agreed to within 5%. The experimental and theoretical studies show that the prediction of the size distribution could be improved by increasing the diffraction efficiency of the hologram. This can be accomplished by producing phase holograms. Spray holograms were also Fourier transform analyzed at various locations of the spray. Photographs of the spray are provided for comparison. The results of this phase show that this method will yield very fast analysis of large amounts of holographic data.

513,904
AD-A148 695/0/GAR PC A04/MF A01
Arnold Engineering Development Center, Arnold AFS, TN.
Development of a Pressure Transducer for Usage in High-Temperature and Vibration Environments. Phase 1. Feasibility Investigation.
Final rept. 10 Sep 83-30 Apr 84,
H. T. Liu, G. Mauer, and P. Zieve. Nov 84, 61p Rept no. AEDC-TR-84-30

The objective of the Phase I project is to determine the feasibility of developing a highly accurate, low-range pressure transducer that is suitable for measurement in environments where high vibrations, high temperatures and varying line pressures create problems for presently available transducers. The primary sensor is an elastic metal diaphragm that forms one plate of a capacitor; the other plate is fixed with respect to the diaphragm. An electronic circuit converts the diaphragm deflections, induced by a pressure force, into voltage variations that are then sampled by a microprocessor, which is to be developed in Phase II. Because of the small oscillating mass of the diaphragm, the transducer has a high natural frequency and is largely insensitive to externally induced vibrations. The simple configuration of the capacitive transducer is potentially very large overloads with appropriate installation of an overload stop between the two plates. In comparison with other types of pressure sensors, the capacitive transducer concept offers an unusual amount of design flexibility for a wide range of operational conditions. Phase I research demonstrated the feasibility of the capacitive transducer concepts, as well as its capability to meet and potentially exceed all DoD requirements for transducer performance. (Author)

513,905
AD-A148 755/2/GAR PC A06/MF A01
Stanford Univ., CA. Edward L. Ginzton Lab. of Physics.
Acoustic Microscopy at Cryogenic Temperatures.
Final rept. 1 Jul 77-30 Jun 84,
C. F. Quate. Nov 84, 103p Rept no. GL-3795
Contract N00014-77-C-0412

The resolution of the acoustic microscope is greatly enhanced by using cryogenic liquids for the coupling medium. Liquid Argon, Nitrogen, and Superfluid Helium have all been used for acoustic microscopy during this program. Superfluid helium at temperatures less than 0.2 K emerges as the ultimate fluid for high resolution acoustic microscopy. Using coherent 300 A sound waves in helium, images with a resolution of 200A have been produced. (Author)

513,906
AD-A148 778/4/GAR PC A03/MF A01
General Accounting Office, Washington, DC. National Security and International Affairs Div.
Chemical Testing of the Bigeye Binary Chemical Bomb.
30 Oct 84, 29p Rept no. GAO/NSIAD-85-3

This report discusses testing of the Bigeye (Binary Chemical Bomb) since the program was restarted in 1976. After the program resumed through 1981, there were eight chemical tests to update earlier program tests on the chemicals. In December 1981, the Secretary of Defense directed that the program be accelerated so that production could start in fiscal year 1984. As a result there were several tests in 1982. This report focused primarily on the events surrounding an October 1982 test failure which later necessitated a restructuring of the program. The test failure resulted from a chemical reaction which involved a rapid increase in temperature and pressure to such an extreme that an inner section of the bomb was forced out the rear of the weapon.

513,907
AD-A148 785/9/GAR PC A03/MF A01
Army Armament Research and Development Center, Dover, NJ. Product Assurance Directorate.
Distribution of Average Particle Diameters for Three Lots of Nitroguanidine as Measured by the Fisher Sub-Sieve Sizer.
Final technical rept. Jul-Aug 83,
E. R. Bixon. Nov 84, 34p ARPAD-TR-84001, SBI-AD-E401 259

Three lots of nitroguanidine were sampled extensively and tested with the Fisher sub-sieve sizer (FSSS). The population of FSSS average particle diameters (APD) were determined for each lot. The components of variance (within-a-drum, between drums, and error variance) were determined for each of the lots with analysis of variance (ANOVA) techniques. In addition, the FSSS test method itself was subjected to ANOVA techniques to determine the components of variance (variance due to technicians, variance due to plug and tube sets, and an estimate of the error variance).

513,908
AD-A148 795/8/GAR PC A02/MF A01
Cold Regions Research and Engineering Lab., Hanover, NH.
Using Electronic Measurement Equipment in Winter.
Technical digest,
R. T. Atkins. Jul 81, 8p Rept no. CRREL-81-1

It is well known that heat is the enemy of electronic semiconductor devices because it causes high noise voltages and large leakage currents. But low temperatures can also present problems--for example, high junction voltages, loss of hermetic seals, and breaks in input/output lead wires. Today, electronic instrumentation and measurement equipment can be successfully operated in a winter field environment much more readily than 10 or even 5 years ago. Semiconductor devices like transistors, diodes, silicon control rectifiers (SCR's), and operational amplifiers will work at temperatures down to -40 C. With modern integrated circuit technology it is much easier to obtain excellent thermal performance from a circuit since the entire circuit is concentrated on a small chip, guaranteeing that all its components will have a uniform temperature. Better design strategies are constantly being developed to keep electronic devices well behaved over wide temperature ranges.

513,909
AD-A148 808/9/GAR PC A07/MF A01
LTV Aerospace and Defense Co., Dallas, TX. Vought Missiles Advanced Program Div.
Mobile Accelerator Neutron Radiography System.
Final rept. Feb 78-Dec 83,
W. E. Dance, S. F. Carollo, and H. M. Bumgardner. Oct 84, 149p 3-56000/4R-169, AMMRC-TR-84-39
Contract DAAG46-78-C-0007

The use of neutron radiography for the inspection and maintenance of large structures such as aircraft has been delayed by the absence of a mobile system particularly suited to the requirements of field use. This report describes the production, extensive field testing, evaluation and disposition of the first mobile neutron radiography system to satisfy the majority of requirements for field use. The system is based upon the concept of a mobile on-off neutron radiography system based on a sealed-tube ion accelerator as neutron source demonstrated earlier by the Vought Corporation. Primary features of the system are its self-propelled mobility, versatile positioning capability scaled to Army helicopter dimensions, an on-off beam capability, exposure capability measured in minutes, and suitability for AMMRC laboratory and field use. Included in the report are a description of all components of the system, an evaluation of the operation of the system, an evaluation of its radiographic capabilities, a description of installation elements for the AMMRC site, and recommendations for next-generation systems. (Author)

513,910
DE84770497/GAR PC A08/MF A01
Karlsruhe Univ. (Germany, F.R.). Fakultaet fuer Chemieingenieurwesen.
Flow Conditions and Mixing in an Enclosed Swirl Flow with Varying Cross-Section.
Diss. (Dr.-Ing.),
W. Hallet. 4 Jul 81, 157p NP-4770497
In German.
U.S. Sales Only. Portions are illegible in microfiche products.

The subject of the experiments was the model of a chemical reactor which consists of cylindrical sections of different diameters where a twisted air flow streamed through. In the most narrow cross-section of the model, a tracer gas was injected by a central nozzle representing a reagent which should be mixed into the main flow after the bottleneck. The mixing of the injected medium with the air flow should be clarified for different numbers of swirl. The occurence of a central back flow at high swirl contributes considerably to the turbulence and the mixing. Important for the in-

terpretation of the mixing process and the generation of turbulence at low swirl was the discovery of a periodical flow mode. The flow mode with central back flow, however, gives clear advantages with respect to the speed and the quality of the mixing. (ERA citation 10:001051)

513,911
DE85000672/GAR PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Ultrasensitive Measuring Devices.
J. Clarke. Aug 84, 10p LBL-18191, CONF-840842-31
Contract AC03-76SF00098
17. International conference on low temperature physics, Karlsruhe, F.R. Germany, 15 Aug 1984.
Portions are illegible in microfiche products.

Both dc and rf Superconducting QUantum Interference Devices (SQUIDs) are widely used as ultrasensitive detectors of magnetic flux. Present research is focussed largely on thin-film dc SQUIDs fabricated with photolithographic techniques. The current status of this field is briefly reviewed. The impact of dc SQUIDs with improved sensitivity on noise thermometry and gravitational wave antennas is discussed. (ERA citation 10:002960)

513,912
DE85001524/GAR PC **A04**/MF **A01**
Los Alamos National Lab., NM.
Literature Review on Aerosol-Sampling Devices for Respiratory Field Studies.
C. R. Sutcliffe. Aug 84, 61p LA-9977-MS
Contract W-7405-ENG-36
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

As part of the first phase of a Respirator Field Performance Factor project for the Occupational Safety and Health Administration/Nuclear Regulatory Commission, a critical review of the literature available on respirator protection studies was completed. Little information was available on experimental conditions, and when the information was available, each study was different in how the aerosol measurements were made and in which parameters were controlled. Under these conditions it is difficult to compare results obtained from different investigators. The literature was also surveyed for characteristics desirable in an aerosol-sampling inlet in order to representatively sample respirable particles. Available ambient aerosol samplers were critically reviewed for their performance characteristics. Recommendations are made to avoid the pitfalls present in many respirator field studies and to help standardize these studies. 57 references, 30 figures, 9 tables. (ERA citation 10:003255)

513,913
DE85002781/GAR PC **A04**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Microprocessor-Controlled Anodic Stripping Voltammeter for Trace Metal Analysis in Tap Water.
R. G. Clem, F. W. Park, F. A. Kirsten, S. L. Phillips, and E. P. Binnall. Jun 84, 56p LBL-18047
Contract AC03-76SF00098
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The construction and use of a portable, microprocessor controlled anodic stripping voltameter for on-site simultaneous metal analysis of copper, lead and cadmium in tap water is discussed. The instrumental system is comprised of a programmable controller which permits keying in analytical parameters such as sparge time and plating time: a rotating cell for efficient oxygen removal and amalgam formation; and, data handling via a minicomputer or analog pen recorder. Plating and stripping potentials are controlled by a digital potentiostat; stripping is done using a staircase waveform with measurement of the current after a one msec delay. In this way charging current effects are minimized. Results of tap water analysis showed 3 +- 1 mu g/L lead, 22 +- 0.3 mu g/L copper, and less than 0.2 mu g/L cadmium for a Berkeley, California tap water, and 1-1000 mu g/L Cu, 1 -2 mu g/L Pb for ten samples of Seattle, Washington tap water. Recommendations are given for a next generation instrument system. 29 references, 23 figures, 6 tables. (ERA citation 10:003257)

513,914
DE85900148/GAR PC **A03**/MF **A01**
Institute of Nuclear Energy Research, Lung-Tan (Taiwan).
Design, Fabrication and Calibration of Orifice Flow Meters for Operation with Water at Pressures Up to 2500 Psia.
S. T. Yin, and C. Y. Chang. Jun 80, 40p INER-0515
U.S. Sales Only. Portions are illegible in microfiche products.

A detailed description of the design, fabrication and calibration of flange-type orifice flow meters for operation with water at pressures up to 2500 psia is presented. The discharge coefficient is determined for each of the orifice flow meter calibrated. All data are tabulated or plotted on commonly used engineering coordinates. (ERA citation 10:001122)

513,915
N85-12011/1/GAR PC **A18**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Wind Tunnel Wall Interference Assessment and Correction, 1983.
P. A. Newman, and R. W. Barnwell. 1984, 417p NAS 1.55:2319, L-15812, NASA-CP-2319
Workshop Held in Hampton, VA., 25-26 Jan. 1983.

No abstract available.

513,916
N85-12070/7/GAR PC **A04**/MF **A01**
von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Minimization of Wall Interference for Three-Dimensional Models with Two-Dimensional Wall Adaptation.
L. Lamarche, and E. Wedemeyer. Mar 84, 56p VKI-TN-149

A method to calculate two dimensional wall adaptation to minimize wall interferences for three dimensional flows is proposed for wind tunnel design. Theoretical formulations for displacement and lift effects are presented. An experimental verification for the displacement effect is included.

513,917
N85-12329/7/GAR PC **A05**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Sphere-Scanning Radiometer for Rapid Directional Measurements of Sky and Ground Radiance: The Parabola Field Instrument.
D. W. Deering, and P. Leone. Nov 84, 96p NAS 1.15:86171, NASA-TM-86171
Submitted for Publication.

A unique field instrument, called the PARABOLA, a collapsable support boom, which is self contained and easily transportable to remote sites to enable the acquisition of radiance data for almost the complete (4 pi) sky and ground-looking hemispheres in only 11 seconds was designed. The PARABOLA samples in 15 deg instantaneous field of view sectors in three narrow bandpass spectral channels simultaneously. Field measurement on a variety of earth surface cover types using a truck boom, a specially designed pickup truck mounting system, and a hot air balloon were studied. The PARABOLA instrument has potential for climatological and other studies which require characterization of the distribution of diffuse solar radiation within the sky hemisphere.

513,918
N85-12330/5/GAR PC **A04**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Nasa Thunderstorm Overflight Program: Atmospheric Electricity Research. An Overview Report on the Optical Lightning Detection Experiment for Spring and Summer 1983.
O. H. Vaughan. Nov 84, 57p NAS 1.15:86468, NASA-TM-86468

This report presents an overview of the NASA Thunderstorm Overflight Program (TOP)/Optical Lightning Experiment (OLDE) being conducted by the Marshall Space Flight Center and university researchers in atmospheric electricity. Discussed in this report are the various instruments flown on the NASA U-2 aircraft, as well as the ground instrumentation used in 1983 to collect optical and electronic signatures from the lightning events. Samples of some of the photographic and electronic signatures are presented. Approximately 4132 electronic data samples of optical pulses were collected and are being analyzed by the NASA and university researchers. A number of research reports are being prepared for future publication. These reports will provide more detailed data analysis and results from the 1983 spring and summer program.

513,919
N85-12332/1/GAR PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Helium Ionization Detection Apparatus.
R. Nagai. Aug 84, 7p NAS 1.15:77505, NASA-TM-77505
Contract NASW-3541
Transl. into English of Japanese Patent No. 58-172544 (Appl. No. 57-55563, 2 Apr. 1982). Transl. by Kanner (Leo) Associates, Redwood City, CA.

In a gas chromatograph apparatus comprising a gas supply (He carrier gas), a sample injection apparatus, a chromatograph column, a He ion detector, and connecting tubes, a foreign gas (other than He) injection apparatus is installed between the sample injection apparatus and the detector. Mixing of the sample gas and foreign gas takes place readily, the sample gas is always maintained at a stable concentrator range, and accurate measurements are possible, especially at low sample gas concentrations.

513,920
N85-12339/6/GAR PC **A03**/MF **A01**
Zeiss (Carl), Oberkochen (Germany, F.R.).
Simultaneous Measuring Absorption Spectrometer.
Final Report, Dec. 1980.
M. Maechler. Jun 84, 46p BMFT-FB-T-84-132
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

By combining holographic diffraction gratings with linear photodiode arrays, simultaneous-measuring spectrometers were developed. Spectral range is from 200 to 600 nm; spectral band width is 2 to 5 nm; recording and evaluating time is 0.1 sec per spectrum; a digital exit is used for the standardized spectrum; photometric accuracy is better than 0.01; exposure time is chosen to exclude protolysis. The devices are well suited to the examination of small samples. They can be applied as a spectral detector in liquid chromatography and for the measurement of reaction kinetics of phototropical processes. For information processing, a microprocessor system was developed.

513,921
N85-12356/0/GAR PC **A02**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England).
Identification of Pulse-Echo Rays in Austenitic Steels.
J. A. Ogilvy. Apr 84, 24p AERE-R-11265

Problems occurring when Pulse-Echo ultrasonic inspection of defects in anisotropic media is carried out are studied. Theoretical work is used to deduce the origin of Pulse-Echo signals in such media. It is concluded that such signals will arise when a ray impinges on a defect whose face is perpendicular to the ray's phase velocity. It is shown that for anisotropic media, the energy propagation of such rays is not necessarily perpendicular to the defect face. Beam energy may be incident onto a defect at some angle non-normal to the defect face and yet give rise to a Pulse-Echo signal. These results are quantified for Pulse-Echo inspection of defects in austenitic weld material. Correct interpretation of signals may, in principle, be performed, eliminating errors in calculating defect orientation and location.

513,922
N85-12570/6/GAR PC **A03**/MF **A01**
Institute of Oceanographic Sciences, Wormley (England).
Nutsatsea: An on Line Data Reduction Program Linking a Chemlab Continuous Flow Analyser to a Commodore Pet Microcomputer.
D. J. Hydes. 1984, 32p IOS-176

The linking of a Chemlab continuous flow analyzer to a Commodore PET microcomputer to provide on line data reduction via a CIL PUPI analog to digital converter and an amplifier-interface unit is described. A program for the determination of the micronutrients ammonia, nitrate-nitrite, phosphate and silicate in seawater is listed.

513,923
N85-12688/6/GAR PC **A02/MF A01**
Optische Werke G.m.b.H., Wedel (Germany, F.R.).
Development of a Measuring Procedure for the Automatic Evaluation of the Flatness of Reflective Surfaces.
Final Report, Dec. 1983.
W. Fahland. Aug 84, 21p BMFT-FB-T-84-168
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

A measuring procedure was developed for the automatic determination of the flatness of polished planes and the sphericity of polished ball-type surfaces. This determination results from the space measurement of interference fringes with standard instruments and diode lines or a digital TV-camera. The measuring procedure particularly suits interferometers in the workshop. The reproducibility is lambda 170 (lambda = 633nm) and meets requirements for normal applications.

513,924
PATENT-4 447 743 Not available NTIS
Department of Energy, Washington, DC.
High Pressure Liquid Level Monitor.
Patent,
V. E. Bean, and F. G. Long. Filed 28 Apr 82, patented 8 May 84, 12p PB85-149680, PAT-APPL-6-372 861
Supersedes DE83-006900. Prepared in cooperation with National Bureau of Standards, Gaithersburg, MD. This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $1.00.

A liquid level monitor for tracking the level of a coal slurry in a high-pressure vessel including a toroidal-shaped float with magnetically permeable bands thereon disposed within the vessel, two pairs of magnetic field generators and detectors disposed outside the vessel adjacent the top and bottom thereof and magnetically coupled to the magnetically permeable bands on the float, and signal processing circuitry for combining signals from the top and bottom detectors for generating a monotonically increasing analog control signal which is a function of liquid level. The control signal may be utilized to operate high-pressure control valves associated with processes in which the high-pressure vessel is used.

513,925
PB85-134047 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
AVS (American Vacuum Society) in 1981: The State of the Society and the Challenges of Growth.
Final rept.,
T. E. Madey. 1982, 5p
Pub. in Jnl. of Vacuum Science and Technology 20, n3 p265-270 1982.

This paper is the text of an address given by the outgoing President of the Society at the 28th National Symposium of the AVS in Anaheim. To commemorate the 50th Anniversary of the American Institute of Physics, of which the AVS is the fastest growing member society, a brief historical overview of the origin of the AVS is provided. The unique role played by the AVS as the most industrially-based AIP society is discussed, and the challenges of rapid growth being experienced by the AVS are explored. The expanding influence of the AVS in the national and international technical community is examined.

513,926
PB85-136059/GAR
(Order as PB85-136042/GAR, PC **E05/MF E01**)
Mitsubishi Electric Corp., Tokyo (Japan).
Hot-Film-Type Fuel-Flow Sensor,
H. Sato, K. Tanimoto, M. Bessho, H. Arai, and Y. Tsuboi. c1984, 4p
Text in Japanese.
Included in Mitsubishi Denki Giho, v58 n10 p1-4 1984.

A wide variety of flow sensors is available for applications including industrial flow meters and measuring instruments. The Mitsubishi hot-film-type fuel-flow sensor has been designed specifically for automotive applications. Fuel-flow values are derived from the heat-transfer phenomena occurring between the heating element and the fuel. The heating element uses a thin platinum film to give a wide range of flow measurements, with excellent responsiveness and low cost in a very small size. The fuel-flow sensor is ideal for the fuel-consumption and fuel-economy meters of the next generation of engine-control systems.

513,927
PB85-136141/GAR
(Order as PB85-136117/GAR, PC **E05/MF E01**)
Mitsubishi Electric Corp., Tokyo (Japan).
Ceramic Gas Sensors with Pronounced Selectivity,
Y. Komine, T. Sawada, and K. Sato. c1984, 4p
Text in Japanese.
Included in Mitsubishi Denki Giho, v58 n11 p22-25 1984.

The simplicity and convenience of ceramic semiconductor gas sensors have led to their widespread use in a variety of atmospheres despite their poor selectivity. Mitsubishi Electric has recently developed a new ceramic gas sensor with improved selectivity for alcohol using a hybrid combination of hydroxide apatite catalyst and films of zinc or tin oxide (ZnO or SnO2. A ruthenium dioxide (RuO2) electrode also functions as a catalyst. The catalytic effect of this electrode has also been established with titanium and niobium oxide sensors, and provides good selectivity for malodorous gases such as hydrogen sulfide (H2S).

513,928
PB85-138204/GAR PC **A04/MF A01**
Environmental Monitoring Systems Lab., Research Triangle Park, NC. Quality Assurance Div.
National Performance Audit Program Ambient Air Audits of Analytical Proficiency - 1983,
R. L. Lampe, B. F. Parr, G. Pratt, O. L. Dowler, and W. J. Mitchell. Oct 84, 64p EPA/600/4-84/077
See also PB84-189935.

This report presents the results of the U.S. Environmental Protection Agency's 1983 National Audit Program by pollutant and by analytical method. Semiannual audits were conducted for SO2 and NO2 (bubbler methods), Pb, NO3(-) and SO4(=) (filter strips) and CO (continuous monitors). One audit was conducted on high-volume flow rate. Continuous SO2 monitors were audited throughout the year, such that no monitor was audited more than once. This was the first year that acid rain audits were conducted for U.S. laboratories – approximately 30 laboratories participated in each semiannual acid rain audit.

513,929
PB85-139079/GAR PC **E04/MF E04**
Science and Engineering Research Council, Chilton (England). Rutherford Appleton Lab.
Improving the Performance of the MWPC (Multiwire Proportional Counter) X-Ray Imaging Detector by Means of the Multi-Step Avalanche Technique,
J. E. Batemen, J. F. Connolly, and R. Stephenson. 1984, 27p RAL-84-089

X-ray imaging systems based on conventional MWPC technology and artificial delay line readout techniques have been developed at RAL for several applications over a period of some eight years. Successful as this effort has been, it is now perceived that very limited scope exists for the further improvement of the imaging capability of the standard MWPC design. Attention has therefore been turned to the possibility of exploiting the Multi-Step Avalanche (MSA) system of electron multiplication in this context. Results from a prototype system are presented which show spatial resolution better than that achieved in our MWPC systems with no wire artefacts in the image. The facility for controlling the effective depth of the detector electronically is also demonstrated, so offering some alleviation of the parallax problem common to all gaseous X-ray detectors.

513,930
PB85-139996 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Effect of Surface Roughness on Ultrasonic Echo Amplitude in Steel.
Final rept.,
G. V. Blessing, P. P. Bagley, and J. E. James. Oct 84, 4p
Pub. in Materials Evaluation 42, n11 p1389-1392, 1400 Oct 84.

The effect of surface roughness on the amplitude of ultrasonic echos has been studied for longitudinal waves in steel over a frequency range of 1 to 20 MHz. A set of five steel sample disks possessed (one-side) front surface roughnesses of a periodic nature ranging from 1 to 23 micrometers rms in height. Successive back-surface echo amplitudes were measured for the water-immersed samples using a multi-cycle tone burst technique. In addition, front surface echos were monitored as a function of roughness at 10 MHz in water, and at 2.3 MHz in air. The effects of several competing factors on echo amplitude were observed: scattering at the front (rough) surface, diffraction within the sample, and material attenuation. While at the lower frequencies, the surface roughnesses studied had little effect on echo amplitude, at 10 MHz and above the amplitude was observed to monotonically decrease with increasing roughness. For a given roughness value, diffraction effects dominated at the lower frequencies, while scattering and attenuation dominated at the higher frequencies.

513,931
PB85-140978 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Programmable Precision Voltage-Step Generator for Testing Waveform Recorders.
Final rept.,
H. K. Schoenwetter. Sep 84, 5p
Pub. in IEEE Transactions on Instrumentation and Measurement IM-33, n3 p196-200 Sep 84.

A pulse generator for testing the approximate step-response of waveform recorders is described. The initial and final levels of voltage steps are each programmable within the range of plus or minus 1 V for 50 ohm termination and within plus or minus 5 V for a high impedance load. Voltage steps within these ranges settle to within plus or minus 0.02% of full-scale range (FSR) in less than 30 ns and 40 ns, respectively, for a load capacitance < or = 30 pF. The corresponding 10-90 percent transition durations are approximately 7 ns and 12 ns.

513,932
PB85-141463 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Review of Ultrahigh Resolution Sizing of Single Droplets by Resonance Light Scattering.
Final rept.,
T. R. Lettieri, and W. D. Jenkins. 1984, 11p
Pub. in American Society for Testing and Materials, Special Technical Publication 848, p98-108 1984.

Resonance light scattering as a means for ultrahigh resolution sizing of liquid droplets in the 5 to 50 micrometer diameter range is reviewed. So far, the technique has been used to make relative size measurements with resolutions of 30 ppm on individual, non-evaporating droplets and 300 ppm on individual, evaporating droplets. The calculated existence of resonances sharper than those observed thus far offers the possibility of size resolutions approaching 0.1 ppm on highly transparent spherical droplets. The paper also reviews the relatively small amount of reported work on resonance light scattering from aerosols and from individual aspheres.

513,933
PB85-141489 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Gas Orifice Meter Discharge Coefficients as Determined by Mass Flow Measurements.
Final rept.,
D. B. Mann, J. A. Brennan, C. F. Sindt, J. F. LaBrecque, and S. E. McManus. 1984, 20p
Contract GRI-5080-353-0422
Pub. in Proceedings of the International Conference on the Metering of Natural Gas and Liquefied Hydrocarbon Gases, London, England, Feb 1-2, 1984, p1-20.

A summary of orifice meter performance data and system descriptions are provided. A U.S. gas industry supported program has generated gas orifice meter performance data for four nominal orifice meter run sizes from 2 to 6 inches with up to six beta ratio of from 0.2 to 0.75. Two meter runs for each of the four nominal line sizes and two sets of orifice plates were interchanged in order to develop full meter performance characteristics. The data have been developed using nitrogen gas as the process fluid and a unique NBS gas flow reference facility capable of directly measuring the mass of gas metered by the orifice meter.

513,934
PB85-141539 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Essential Features of a Laboratory Quality Assurance Program.
Final rept.,
J. K. Taylor. 1984, 8p
Pub. in American Society for Testing and Materials, Special Technical Publication 845, p66-73 1984.

Progress in the environmental sciences is vitally dependent on reliable data resulting from complex measurement processes. Because of this complexity, the measurement process must be well designed and operate in a state of statistical control. A quality assurance program, including quality control and quality assessment procedures, denotes those features that lead to the production of data under this condition. The rudimentary features are described together with the expected benefits. Parallelisms are drawn with a well designed manufacturing process.

513,935
PB85-142057 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Instrumental Aspects of Supercritical Fluid Chromatography.
Final rept.,
T. J. Bruno. 1984, 8p
Pub. in Proceedings of Symposium on Energy Engineering Sciences, Research on Instrumentation, Testing and Evaluation (2nd), Argonne, IL., April 10-11, 1984, Conf-8404123, p78-85.

Supercritical fluid chromatography (SFC) offers many unique advantages as a tool for analytical and physicochemical studies. It logically is an intermediary between gas (GC) and liquid chromatography (LC). In this short review, the instrumental aspects of SFC will be discussed, after a short discussion on GC and LC to set the stage.

513,936
PB85-142628 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Volume Uncertainty of a Large Tank Calibrated by Photogrammetry.
Final rept.,
J. D. Siegwarth, J. F. LaBrecque, and C. L. Carroll.
Aug 84, 8p
Sponsored by Maritime Administration, Washington, DC.
Pub. in Photogrammetric Engineering and Remote Sensing 50, n8 p1127-1134 Aug 84.

The volume calibration uncertainty of large (30,000 cu m) liquefied natural gas tanks calibrated by photogrammetry has been independently estimated by the National Bureau of Standards. The independent estimates were obtained using surveying tapes.

513,937
PB85-142834 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Application of a Microwave-Induced Helium Plasma Detector at Atmospheric Pressure for Gas Chromatographic Capillary Columns.
Final rept.,
S. P. Wasik, and F. P. Schwarz. 1980, 4p
Pub. in Jnl. of Chromatographic Science 18, n12 p660-663 1980.

The analytical performance of a modified version of Beenakker's cavity was evaluated as a microwave-induced plasma detector (MPD) for gas chromatographic capillary columns. The MPD compared favorably with the flame ionization detector (FID), with respect to peak resolution and ease of operation. The FID performance was superior in detection limits and linear range for compounds containing carbon. For compounds containing mercury, the MPD and the FID had the same sensitivity.

513,938
PB85-142917 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Laser Enhanced Ionization Flame Velocimeter.
Final rept.,
P. K. Schenck, J. C. Travis, G. C. Turk, and T. C. O'Haver. 1982, 4p
Pub. in Applied Spectroscopy 36, n2 p168-171 Mar/Apr 82.

The temporal and spatial evolution of the depleted neutral atom density following laser enhanced ionization in laminar flow flames has been used to characterize the flow velocity of the flame gases. This technique utilizes a low power CW dye laser and a low sodium seed density (10 to the 11th power-10 to the 12th power atoms/cc). The flow velocity can be measured to better than 2 percent in standard analytical burners.

513,939
PB85-143006 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Sensitivity of Commerical Ion Gage Tubes.
Final rept.,
C. R. Tilford. 1981, 1p
Sponsored by Department of Energy, Washington, DC., Illinois Univ. at Urbana-Champaign, Argonne National Lab., IL., and Institute of Electrical and Electronics Engineers, Inc., New York.
Pub. in Proceedings of Symposium on Engineering Problems of Fusion Research (9th), Chicago, IL., October 26-29, 1981, p1924+, IEEE Catalog No. 81CH1715-2 NPS, p1924+ 1981.

Fusion science and engineering requires an increasing number of accurate vacuum measurements. In order to determine what level of a performance can be expected from different ion gages a gage characterization program has been initiated. This program determines the uniformity, accuracy, and linearity for different gage tubes, and for the more promising candidates further characterizes the sensitivity for different gases and the effects of changing bias voltages and emission currents. Results to date show the best performance from conventional triode and tubulated Bayard/Alpert gages with tungsten filaments. Significantly poorer results are obtained from nude Bayard/Alpert gages and gages with thoriated iridium filaments.

513,940
PB85-143303 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Ellipsometry of Rough Surfaces.
Final rept.,
T. V. Vorburger, and K. C. Ludema. 1980, 13p
Pub. in Applied Optics 19, n4 p561-573, 15 Feb 80.

The authors have done ellipsometry measurements on several different kinds of rough surfaces and compared them with stylus measurements of the surface texture. For steeply-sloped, periodic surfaces, the authors observe rapid variations in the ellipsometric angles, delta and psi, versus the angle of incidence for certain angles. This effect is ascribed to interference between the singly and doubly scattered light waves. For a set of Ni replicas of machined surfaces, the surface composition was varied between sets of measurements by evaporating first Al, then Au on them. The systematic effects due to surface roughness are in disagreement both with theory and with previous experiments. The possible reasons for this are discussed, along with the prospects for using ellipsometry as a tool for measuring surface roughness.

513,941
PB85-144376 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Simple Vacuum Pump Exhaust Filter.
Final rept.,
R. A. Forman, and H. D. Krantz. Sep 84, 1p
Pub. in Review of Scientific Instruments 55, n9 p1503 Sep 84.

A simple high throughput, exhaust filter for oil-filled mechanical vacuum pumps is described. The design allows easy connection to external systems. Inexpensive filter elements, available anywhere, are a further feature of the system.

513,942
PB85-144475 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Position-Sensitive X-ray Detector.
Final rept.,
B. P. Duval, J. Barth, R. D. Deslattes, A. Henins, and G. G. Luther. 1984, 5p
Pub. in Nuclear Instruments and Methods in Physics Research 222, p274-278 1984.

The authors have constructed a single anode wire position sensitive gas proportional detector with a fwhm of 80 micrometers for a highly collimated monochromatic beam of 8 keV photons over a useful range of 38 mm, operated with 600 Torr Xe/CH4. The transfer function of the detector has been measured and explained by the theoretical charge distribution induced on the cathode.

513,943
PB85-144491 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Absolute, Prompt Gamma-Ray Spectroscopy and the Determination of Fundamental Constants.
Final rept.,
R. D. Deslattes, G. L. Greene, and E. G. Kessler.
Mar 84, 6p
Pub. in Jnl. de Physique C3, n45 pC3-41-C3-46 Mar 84.

There currently exists a highly accurate absolute wavelength scale for electromagnetic radiation which extends from microwaves to gamma-rays having energies less than about 1 MeV. This scale begins with the cesium atomic beam clock (and thus the SI meter) and continues through the iodine stabilized HeNe laser. Such a laser is then used to determine the lattice spacing of a single crystal of Si using x-ray/optical interferometry. Accurately calibrated crystals are then used in a flat diffractometer to determine absolute gamma-ray wavelengths. The authors propose to extend this scale to the region of about 1-10 MeV. This requires the use of in-pile sources for the examination of prompt gamma-rays from n-gamma reactions.

513,944
PB85-144509 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Photon Energy Analysis by Reflectivity Modulation.
Final rept.,
P. L. Cowan. 15 May 84, 5p
Pub. in Nuclear Instruments and Methods in Physics Research 222, n1-2 p46-50, 15 May 84.

X-ray mirror reflectivity versus energy is approximately a step function. By dithering the orientation of an X-ray mirror and phase detecting the reflected photons, one obtains a response function which is the derivative of this step function. A photon response function with a narrow energy resolution is thus produced. This photon energy analysis by reflectivity modulation is analogous to a modulated retarding grid electron energy analyzer. The energy resolution and the peak efficiency of the response function are determined by the optical constants or the mirror, the amplitude of the dither and the collimation of the photons, so the signal can be increased at the expense of energy resolution by altering the dither amplitude. Although the resolving power is low compared with what can be achieved with crystals, reflectivity modulation has several advantages over crystal based monochromators and spectrometers. Reflectivity modulation can be used over a very large energy range, including soft X-rays. For focused applications, the surface of an X-ray mirror is more easily figured than the diffracting planes of a crystal. The response function of a mirror is harmonic free and most importantly, the signal amplitude can be much higher than from crystals.

513,945
PB85-145142 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Quantitative Particle Analysis in Electron Beam Instruments.
Final rept.,
J. A. Small. 1981, 15p
Pub. in Scanning Electron Microscopy, n1 p447-461 1981.

Various methods which have been developed for the quantitative analysis of particles in electron beam instruments are reviewed. This review includes two procedures, relative sensitivity-factor and local mass methods, which apply to the analysis of particles fitting the thin film criterion. These particles are generally less than a few tenths of a micrometer in diameter and are best analyzed with the analytical electron microscope at beam energies of 100 keV or more. Six additional methods are described including normalization of ZAF results, methods requiring particle standards, normalization of beam raster area modified P-factors, geometric modeling of particle shape, and peak-to-background normalization. These methods are best suited for the SEM/EDS analysis of particles with diameters larger than a few tenths of a micrometer. Included in the discussion of the various methods is the error histogram for 200 particle analyses run with the normalized ZAF method. The various particle effects like mass, absorption, and secondary flourescence which make quantitative particle analysis difficult are also discussed. Finally, the experimental requirements which are unique to each analysis method are reviewed.

513,946
PB85-145159 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Daguerreotypes: A Study of the Plates and the Process.
Final rept.,
A. Swan, C. E. Fiori, and K. F. J. Heinrich. 1979, 13p
Pub. in Scanning Electron Microscopy, n1 p411-423 Apr 79.

Daguerreotypy was the first widely used photographic process. The pictures consist of silver mercury amalgam particles on a silver substrate. It was necessary to develop a description and explanation of the process, since this was not available in the literature. The results of a detailed electron microprobe analysis of both pristine and deteriorated daguerreotypes are presented. The studies have shown that multiple interdependent deterioration processes are present involving not only the plate surface but also the copper support, the cover glass and the microclimate in the case.

513,947
PB85-145357 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Performance Characteristics of a Broad Range Ionization Gage Tube.
Final rept.,
C. R. Tilford, K. E. McCulloh, and H. S. Woong. 1982, 4p
Pub. in Jnl. of Vacuum Science and Technology 20, n4 p1140-1143 1982.

Seven commercial 'broad range' Bayard-Alpert ionization gage tubes were calibrated for nitrogen, argon, hydrogen, deuterium, and helium. The data showed an inexplicable grouping of the gage tubes into two distinct groups, one with small voltage coefficient typical of Bayard-Alpert gages, the other with much larger coefficients, such as expected from conventional triode gages.

513,948
PB85-145498 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Apparatus for the Measurement of Gas Fluxes through Immobilized Liquid Membranes.
Final rept.,
B. R. Bateman, J. D. Way, and K. M. Larson. 1984, 12p
Pub. in Separations Science and Technology 19, n1 p21-32 1984.

An automated apparatus to measure gas fluxes through immobilized liquid membranes is described. Specific design features permit safe operation for experimentation with CO, NO, and H2S. Nitric oxide fluxes through immobilized Fe(II) solutions have been measured and are presented as a typical equipment application. Facilitation factors (ratio of total flux to flux without carrier) greater than 5 were observed.

513,949
PB85-145522 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Pulse Calorimetry.
Final rept.,
A. Cezairlyan. 1984, 26p
Pub. in Compendium of Thermophysical Property Measurement Methods Chapter 16, 1, p643-668 1984.

Developments of pulse calorimetric techniques for the measurement of specific heat of electrically conducting substances are presented. Emphasis is placed on millisecond and microsecond resolution calorimetry as applied to measurements at temperatures above about 1000 K. Experimental difficulties related to the dynamic measurements of experimental quantities, such as power and temperature, are discussed, and sources and magnitudes of errors are given.

513,950
PB85-145639 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Laser Magnetic Resonance of the O2 Molecule at 699 micrometers.
Final rept.,
M. Mizushima, K. M. Evenson, J. A. Mucha, D. A. Jennings, and J. M. Brown. 1983, 12p
Contract NASA-W-15047
Pub. in Jnl. of Molecular Spectroscopy 100, p303-315 1983.

A new highly sensitive far infrared optically pumped laser magnetic resonance (LMR) spectrometer has facilitated the observation of 21 transitions in O2 at 699 micrometers (428.6285 GHz). From the intensity of the observed lines the sensitivity limit of this LMR spectrometer is found to be about 10 to the -9th power/cm at this frequency with a 1-sec time constant.

513,951
PB85-147890 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
National Bureau of Standards (NBS) Temperature Scale in the Range 15 to 200 mK.
Final rept.,
J. H. Colwell, W. E. Fogle, and R. J. Soulen. 1984, 2p
Pub. in Proceedings of International Conference on Low Temperature Physics (17th), Karlsruhe, Germany, August 15-22, 1984, p395-396.

The authors have studied the reproducibility upon thermal cycling of several types of thermometers. A Josephson junction noise thermometer, a CMN thermometer, and an SRM 768 superconductive fixed-point device were very consistent, while a germanium and a carbon resistance thermometer showed significant irreproducibility.

513,952
PB85-147940 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Characteristics of Ion Gages.
Final rept.,
C. R. Tilford. 1984, 10p
Pub. in Proceedings of International Symposium on Vacuum Technology and Nuclear Applications, Bombay, India, December 6-9, 1983, p139-148 1984.

The operation of ionization vacuum gages is affected by a number of factors that make it very difficult to theoretically predict or characterize their performance. This has lead to efforts in recent years to experimentally characterize the properties of commercially available gages. Factors affecting the performance of ion gages are discussed and results are presented from a National Bureau of Standards program that has determined nitrogen sensitivities, relative sensitivities for several common gages, dependences on operating parameter, and limited long-term stability tests for samples of several gage types. The results favor tungsten filament gages, particularly of the conventional triode type. However, one design of a dual tungsten filament Bayard-Alpert gage came close to the conventional triode in many criteria and performed significantly better on a limited long-term stability test.

513,953
PB85-148500 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Densimetry in Compressed Fluids by Combining Hydrostatic Weighing and Magnetic Levitation.
Final rept.,
R. Masui, W. M. Haynes, R. F. Chang, H. A. Davis, and J. M. H. L. Sengers. Jul 84, 11p
Contract DOE-EA-77-A-01-6010
Sponsored by Science and Technology Agency, Tokyo (Japan).
Pub. in Review of Scientific Instruments 55, n7 p1132-1142 Jul 84.

A magnetic densimeter is described that has been built for measuring the density of compressed liquids at pressures up to 15 MPa in the temperature range 20-200C with a desired accuracy of 0.1%. The densimeter combines the principle of magnetic levitation of a buoy with that of liquid density determination by hydrostatic weighing. To this effect, the support coil is suspended from an electronic balance, and the balance readings are recorded (1) with the buoy at rest, and (2) with the buoy in magnetic suspension. Details are given of the construction of the cell, coil, buoy and thermostat. The procedure is described by which cell and buoy are aligned so that the suspended buoy does not touch the cell wall. Test data on the densities of seven different liquids were obtained at room temperature. They agree with reliable literature values to within 0.1%. In a separate experiment, the thermal expansion coefficient of the buoy material was determined. This experiment and its results are also given here.

513,954
PB85-854222/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Nondestructive Testing: Acoustic Emission Techniques and Equipment. May 1982-January 1985 (Citations from the Metals Abstracts Data Base).
Rept. for May 82-Jan 85.
Jan 85, 122p
Supersedes PB84-853498.

This bibliography contains citations concerning acoustic emission techniques and equipment for the nondestructive inspection and evaluation of a wide variety of non-nuclear materials,objects, and structures. Ultrasonic techniques are excluded. (This updated bibliography contains 172 citations, 101 of which are new entries to the previous edition.)

513,955
PB85-854651/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Non-Ultrasonic Acoustic Nondestructive Testing. 1975-January 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Jan 85.
Jan 85, 214p
Supersedes PB83-860429.

This bibliography contains citations concerning non-ultrasonic, acoustic nondestructive inspection and evaluation techniques, equipment, and applications. Topics include acoustic emission techniques, acoustic holography, and acoustic microscopy. Applications for a variety of materials, objects, and structures are presented. (This updated bibliography contains 255 citations, 98 of which are new entries to the previous edition.)

14E. Reprography

513,956
PB85-136117/GAR PC **E05**/MF **E01**
Mitsubishi Electric Corp., Tokyo (Japan).
Mitsubishi Denki Giho, Vol. 59, No. 11, 1984.
c1984, 78p
Text in Japanese. See also PB85-136125 through PB85-136174 and PB85-111449.

The issue contains articles on: A Thick-Film Thermal Head with CMOS Drivers; Ceramic Gas Sensors with Pronounced Selectivity; A Multi-Step-Focus Electron Gun for Mini-Neck Color CRTs; An Optical Pickup for the Model MLP-2 Compact Disc Player; High-Density Packaging Technology; An Optical Pickup Servocontrol IC for Compact Disc Players; The Electrical System of Bobo No. 1 Thermal-Power Station: A Modern Middle-Load Station on an Artificial Island; A Signal Processor for Digital-Audio Compact Discs; The Elepet Advance V, A New Standardized Elevator; A Packet-Switching Network for the Chubu Electric Power Company; Compact Self-Ballasted Fluorescent Lamps with a Newly Developed Globular Structure and Series F1 Wire-Cut EDMs.

513,957
PB85-136133/GAR
(Order as PB85-136117/GAR, PC **E05**/MF **E01**)
Mitsubishi Electric Corp., Tokyo (Japan).
Thick-Film Thermal Head with CMOS Drivers,
T. Sawae, H. Yamashita, T. Endo, E. Hatabe, and T. Tobita. c1984, 4p
Text in Japanese.
Included in Mitsubishi Denki Giho, v58 n11 p18-21 1984.

Improvements in thermal-head performance have led to the widespread application of thermal-printing technology. The article reports a compact, lightweight thick-film thermal head with CMOS drivers for low power consumption, in which special consideration was given to ease of installation and maintenance and to high printer performance.

15.

MILITARY SCIENCES

15B. Chemical, Biological, and Radiological Warfare

513,958
AD-A148 584/6/GAR PC **A11/MF A01**
National Research Council, Washington, DC. Committee on Demilitarizing Chemical Munitions and Agents.
Disposal of Chemical Munitions and Agents.
1984, 234p
Contract DAAG29-82-C-0012

For more than half a century, the United States has maintained a stockpile of highly toxic chemical agents and munitions for possible use in a wartime situation. The United States maintains its stockpile principally to deter other countries from using such munitions against U.S. forces. Four basic chemicals are kept. These are the nerve agents VX, which is persistent in its effects, and sarin (GB),* which is nonpersistent; the mustard agents H, HD, and HT, which are usually referred to simply as H; and the hallucinogenic agent BZ. These chemical agents are stored at eight U.S. Army depots in the Continental United States as well as on Johnston Atoll in the Pacific Ocean. The latter depot was not a part of this study. Each depot varies in size, in the type and number of agents and munitions in storage, and in its proximity to off-site civilian populations. Moreover, the agents are kept in a variety of containers and munitions--rockets, land mines, artillery and mortar shells, bombs and spray tanks, and bulk containers.

15E. Logistics

513,959
AD-A148 653/9/GAR PC **A04/MF A01**
Logistics Mangement Inst., Bethesda, MD.
Air Force Stock Fund and Aircraft Availability.
Working note,
C. H. Hanks. Oct 84, 63p Rept no. LMI-AF301-4
Contract MDA903-81-C-0166

The methods and results of this work represent a first step in quantifying the relation between consumable parts and end-item readiness. This working note addresses the effect on aircraft availability rates if safety levels in the wholesale Air Force stock fund were to change. (Safety levels are the stock levels maintained to cover variations in demand.) The results are that as many as 150 additional aircraft, Air Force-wide, could become unavailable due to parts, if safety levels fell to the extent that wholesale fill rates dropped 5 points, from 85% to 80%. Originator-supplied keywords include: EOQ(Economic Order Quantities), Inventory management, Inventory modeling, Inventory theory, Material management, Reorder points, Resources-to-Readiness, Spare parts, and Weapon system orientation.

513,960
AD-A148 669/5/GAR PC **A12/MF A01**
Army Concepts Analysis Agency, Bethesda, MD.
Utilization of Increased Airlift Capability (UIAC) Study.
Study rept. Apr-Sep 84,
J. A. Sorenson, and J. DePalma. Sep 84, 272p Rept no. CAA-SR-84-29

This study examined the increases in peacetime airlift capacity due to the Military Airlift Command's fleet expansion, determined the impacts on the Army transportation system and developed a process to select the most suitable cargo and route combinations to use the additional capacity. The results of analysis indicated that transportation cost avoidances could be realized by diverting surface port-packed cargoes to airlift; however by increasing airlift resupply, potential cost savings could increase. (Author)

513,961
AD-A148 747/9/GAR PC **A07/MF A01**
Naval Postgraduate School, Monterey, CA.
Cost Analysis for Competitive Major Weapon Systems Procurement: Further Refinement and Extension.
Final rept.,
W. R. Greer. Sep 84, 127p Rept no. NPS54-84-023

Aerospace industry capacity utilization (CU) rate was found to be a major price determinant of major weapons systems. This study examines the feasibility and desirability of using more firm-specific measures of CU. A reliable method of forecasting the aerospace industry's CU is developed. Our study also finds that the sole source program costs are also related to the level of CU. In addition to CU, the magnitude of savings from second sourcing is also affected by the quantity split between the two suppliers. Contractor teaming as an acquisition strategy is assessed.

513,962
AD-A148 841/0/GAR PC **A05/MF A01**
Construction Engineering Research Lab. (Army), Champaign, IL.
Field Testing of a Lightweight Relocatable Structure in a Desert Environment.
Final rept.,
A. Kao, S. Lane, J. Carr, L. Wahigren, and P. Klause. Sep 84, 79p Rept no. CERL-TR-M-361

This report describes the field tests of a commercially available, off-the-shelf lightweight relocatable structure (LRS) systems selected for possible military application in a theater or operations. The structural system selected for the field tests was a panelized system manufactured by Kelly Klosure, Inc. The purpose of the tests was to determine the constructibility and habitability of the building system. The tests are being conducted in two stages: Stage I tests were conducted in a desert environment, and Stage II tests are being conducted in a temperate environment. This report documents the results of the Stage I tests. The test results showed that the 20-ft-wide and 8-ft-high building can be erected manually by unskilled troop labor using only hand tools. However, for a 12-ft-high building assembled using 4- x 8-ft panels, a crane is needed to help lift assembled components for the erection. Based on overall constructibility and environmental performance, the fiberboard panel system is the better choice. Several modifications were made to the system during the field tests. It is recommended that these modifications be incorporated into system design and further field tests conducted before making a final evaluation.

15G. Operations, Strategy, and Tactics

513,963
AD-A148 746/1/GAR PC **A02/MF A01**
Naval Postgraduate School, Monterey, CA.
Analysis of Three Post Launch Evasion Strategies.
Technical rept.,
R. N. Forrest. Jun 84, 24p Rept no. NPS71-84-001

This report contains an analysis of three post launch evasion strategies. The purpose of the analysis is to provide equations that can be used with values determined by other means to obtain a conservative estimate of the relative effectiveness of the three strategies under specified conditions. The measure of effectiveness that is used in the analysis is the probability that, because of the localization resulting from a launch, a launching submarine will be damaged by an opponent's weapon. The effectiveness of an evasion strategy depends on the number of weapons that will be used by an opponent against an evading submarine and on the time and the location at their detonation. The effectiveness also depends on the weapon damage range and the maximum evasion speed. Factors which constrain the number of weapons that could be used by an opponent and the maximum evasion speed of a submarine and factors which determine weapon damage range are not considered in the analysis.

513,964
AD-A148 773/5/GAR PC **A05/MF A01**
Historical Evaluation and Research Organization, Dunn Loring, VA.
Conventional Attrition and Battle Termination Criteria. A Study of War Termination.
Technical rept.,
G. M. Hammerman. 1 Aug 82, 82p DNA-TR-81-224, SBI-AD-E301 527
Contract DNA001-81-C-0283

This study (1) distinguishes among, and briefly describes the terminations of, battles, campaigns, and wars; (2) discusses concepts and terminology for war termination; (3) presents three case studies of terminations of short, post-1945 wars (4) presents a survey of the literature on war termination; and (5) presents in matrix form data on 13 20th Century war terminations. The study does not find any significant association between casualty levels and war termination.

16.

MISSILE TECHNOLOGY

16D. Missiles

513,965
N85-12044/2/GAR PC **A03/MF A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Goettingen (Germany, F.R.).
Empirical Formulas for the Prediction of the Base Pressure of Missile Bodies at Subsonic Velocities.
M. Tanner. Jun 84, 48p DFVLR-FB-84-23
In German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-893).

Empirical formulas to predict base pressure of missile bodies at subsonic speeds were derived for Reynolds number = 340,000. The formulas are valid for angles of incidence 0 to 20 deg arc for cylindrical and boattailed afterbodies. Mach numbers were varied between 0.50 and 0.90. Calculations and measured results show good agreement for cylindrical afterbodies, while for boattails discrepencies appear.

17.

NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

17B. Communication

513,966
AD-A148 593/7/GAR PC **A06/MF A01**
California Univ., San Diego, La Jolla.

Interactive Activation Model of Speech Perception.
Final status rept. 1 Mar 82-30 Sep 84,
J. L. McClelland, and J. L. Elman. 1 Nov 84, 114p
Contract N00014-82-C-0374

The objective of this research was to construct a model of human speech perception, using an interactive activation framework. Computer simulations of several versions of this model were developed. One version accepted real speech as input. A second version took simulated speech input and extracted phonemes, words, and simple phrases. The model was able to account for a variety of phenomena which have been observed in human speech perception; it also suggested behavior which had not previously been observed in human listeners but which was subsequently verified through experimental work.

513,967
AD-A148 616/6/GAR PC A02/MF A01
Naval Research Lab., Washington, DC.
Commentray on the Utilization of Real-Time Channel Evaluation Systems in HF Spectrum Management.
Memorandun rept.,
J. M. Goodman, M. Daehler, M. H. Reilly, and A. J. Martin. 28 Nov 84, 10p Rept no. NRL-MR-5454

Real-Time Channel Evaluation (RTCE) devices are coming into increased use in modern management of HF communications systems. The earliest techniques used in channel evaluation exploited vertical incidence pulse sounders (VIS) and these devices are still being used for some applications. An oblique incidence sounding technology has also been developed employing both pulse and chirp waveform approaches. A variety of RTCE devices are identified in the report but the emphasis is placed on the OIS chirp sounder. Using this device as a canonical channel evaluator, the implications for global, theater, and local HF resource management may be addressed. As one might suspect, there are both advantages and disadvantages which may accrue from construction of a sounder network. Issues include: data applicability, data collection and dissemination, network size and cost, network ECM vulnerabilities, optimum network architecture, and system component reliabilities, to name a few. These issues are outlined in the report.

513,968
AD-A148 624/0/GAR PC A08/MF A01
Naval Postgraduate School, Monterey, CA.
Using the Control System Design Environment in the Design of a Data Link Receiver Unit for the Coast Guard HH-65A Helicopter.
Master's thesis,
F. S. Fox. Jun 84, 166p

This thesis is an attempt to prove the value of the Control System Design Environment by designing a shipboard or ground-based data link receiver to communicate with the data link installed in the Coast Guard HH-65A helicopter. The Control System Design Environment was intended to allow a designer to use a high-level language to describe the required inputs and outputs of a system. This high-level language, the Control System Design Language (CSDL) is translated into a list of primitives by a Pascal program, CSDL.PAS. The primitive list is then compiled into assembly language by a FORTRAN program, NEWCSDL.FOR. The final output includes the hardware and software lists to build a controller that meets the designer's specifications. This particular project includes a project design much more ambitious than any previously attempted in the Control System Design Environment. (Author)

513,969
AD-A148 679/4/GAR PC A09/MF A01
Harris Corp., Melbourne, FL.
RF Fiber Optic Link.
Final rept. Oct 81-May 83,
J. J. Pan. Jun 84, 181p RF-001/0161A, RADC-TR-84-118
Contract F30602-81-C-0259

A fiber optic link which sets the state of the art (July 1982) in direct optical source modulation in passing a RF carrier and its associated modulation was developed under this Laboratory Director's funded program to Harris Corporation. The 1 kilometer long link has a 800 MHz passband and operates between 4.4 to 5.0 GHz. The gain flatness across the band was measured at +or- 1.5 db at a modulation depth of 65%. The input/output VSWR is 1.5 to 1db. The link employs a 3 state amplifier in the APD receiver and has provided a S/N of 48 db measured over a 300 KHz bandwidth. The S/N can be further improved by additional amplifier stages. Optical componentry within the link includes an injection laser diode operating at a wavelength of 840 nm and a single mode fiber with bandwith greater than 7 GHz and a core size of 6 micron.

513,970
AD-A148 689/3/GAR PC A06/MF A01
Kansas Univ./Center for Research, Inc., Lawrence.
Modified Monte-Carlo Technique for the Simulation of Satellite Communication Systems.
Final rept. 1 Jul 83-31 Jul 84,
K. S. Shanmugan. 30 Oct 84, 119p TR-617-1, AFOSR-TR-84-1049
Grant AFOSR-83-0171

Civilian and military communication networks use satellite links for digital transmission of information. The analysis of performance of digital communication systems operation over non-linear satellite channels is a difficult task and no complete analytical treatment of the problem is currently available. Several recent efforts have been directed towards the evaluation of performance as measured by the end-to-end symbol error probability using Monte-Carlo simulations. These simulations require excessively large sample sizes and are not practical for estimating low values of error probabilities. In this report, the investigators present a technique for reducing the sample size requirements of Monte-Carlo simulation of satellite communication links. The method is based on a combination of a modified (importance) sampling technique and an extrapolation technique Sample size reduction of the order of 100 appears to be possible with this technique.

513,971
AD-A148 692/7/GAR PC A03/MF A01
Navy Experimental Diving Unit, Panama City, FL.
Recompression Chamber Communication Systems Test and Evaluation.
Final rept.,
J. D. Pelton, and M. D. Curley. Apr 84, 46p Rept no. NEDU-8-84

Five commercially available Hardwire Communications Systems were tested at the Navy Experimental Diving Unit for Use as two-wire communications systems on recompression chambers. These systems were designed to serve as the primary means of communication between outside personnel and personnel inside the chamber. The communication systems were evaluated and rated by how well they fulfilled specific critical parameters related to this application. The five systems evaluated were Helle Models 3220 and 3214, Amron Model AMCOM II 2820, EFCOM Model DAR-1000, and Atkinson Dynamics Model AD-27H-M2. Overall, the AMCOM II and EFCOM DAR-100 were rated the best communicators by the system operators on human factors variables. The overall ranking of the systems was in agreement with the operators' confidence in each communicator. In summary, the AMRON Model AMCON II and the EFCOM Model DAR-1000 communication systems were considered to be reliable and effective instruments of communication with occupants in U.S. Navy recompression chambers from 0 to 165 FSW. Originator-supplied keywords include: Diver phones, and MIL-STD 810C.

513,972
AD-A148 694/3/GAR PC A03/MF A01
Aerospace Corp., El Segundo, CA. Electronics Research Lab.
Millimeter Wave Antenna Technology,
R. B. Dybdal. 30 Sep 84, 41p TR-0084(4925-06)-1, SD-TR-84-52
Contract F04701-83-0084

Millimeter wave antenna technology has had a long history of development, and as millimeter wave systems evolve through planning to implementation, a significant amount of additional development work will be required. Millimeter wave antennas play a key role in the rationale for millimeter system designs because high spatial resolution can be achieved with modest physical dimensions. Reflector, lens, array, and horn technologies are surveyed. Multiple beam designs and adaptive processing antennas are described because these technologies afford high leverage opportunities to enhance electronic survivability and to extend communication capabilities. Ancillary components, such as radomes, are a necessary part of practical antenna designs and are discussed in some detail. Originator-supplied keywords include: Array Antennas, Lens antennas, Multiple beam antennas, and Reflector antennas.

513,973
AD-A148 772/7/GAR PC A04/MF A01
Kaman Tempo, Santa Barbara, CA.
Status Report on Environment, Propagation and System Modeling for an ELF/VLF/LF(Extremely Low Frequency/Very Low Frequency/Low Frequency) Ionospheric Dependent Propagation Code.
Technical rept.,
R. R. Rutherford, and W. S. Knapp. 28 Jun 83, 54p KT-83-017(R), DNA-TR-82-161, SBI-AD-E301 534
Contract DNA001-82-C-0024

This report describes the continuing work on WEDCOM during the 1982 contractual period. Environmental models were updated and efficient propagation computational procedures were implemented to reduce execution time. Procedures were developed to provide the WEDCOM user with an automated method of selecting calculation times and ionization profile locations consistent with nuclear environmental sensitivities. VLF/LF signal processing models were adapted for use in WEDCOM and procedures for including atmospheric noise were developed.

513,974
AD-A148 819/6/GAR PC A06/MF A01
Army Military Personnel Center, Alexandria, VA.
Star on the Horizon: The Emergence of the Direct Broadcast Satellite in American Mass Communications.
Master's thesis,
J. H. Thomas. 21 Dec 84, 114p

The purpose of this thesis is to describe the concept of broadcasting from satellites directly to the viewer equipped with a small, inexpensive receiving antenna, and the evolution of this technology as a means of commercial broadcast. Emphasis is place on the problems of developing a regulatory framework for DBS by the Federal Communications Commission. The opposition of the existing broadcasters to the unregulated development of direct broadcast satellite (DBS) is explored in light of the possible effect that DBS may have on the economic base, audience, and advertising revenue of existing broadcasters. The information for this study was obtained from government documents, legal journals, books and the popular press. Two basic conclusions are drawn from this study: First, that the existing broadcasters have opposed the 'marketplace' development of DBS, and second, that DBS does not pose as great a threat, at least in the near term, as the broadcasters fear. (Author)

513,975
N85-12081/4/GAR PC A03/MF A01
Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Unternehmensbereich Raumfahrt.
Telemetry (TM)/Telecommand (TC) Processor Study.
Final Report.
Mar 84, 44p ESA-CR(P)-1915
Contract ESTEC-5563/83/NL-BS

Functions to be performed to receive telemetry from and send telemetry to a satellite system during assembly, integration and testing activities at system level, using ESA-type checkout equipment architecture, were identified. A telemetry/telecommand processor (TTP) model was defined. The TTP should consist of at least two physically separated building blocks: a transport subsystem (TTPT), and a management subsystem (TTPM). The TTPM acts as a gateway to the TM/TC data transfer system. A star-type communication system between electrical ground support equipment is recommended. The MTP comprises the centralized facilities for the control of the master test sequence and of the overall test configuration. The TTPM comprises the centralized facilities for TM data distribution, and TC data acquisition and time distribution.

513,976
N85-12278/6/GAR PC A03/MF A01
Communications Research Centre, Ottawa (Ontario).
SLIM TDMA ANIK B Pilot Project.
W. D. Hindson, W. J. Robertson, and R. C. Archard. Jun 84, 26p CRC-REPT-1366

The technical and service feasibility of a 3 Mbps TDMA system was evaluated in a pilot project utilizing the ANIK B satellite. The organization and conduct of the

project and its conclusions regarding the feasibility of light-route TDMA are summarized.

513,977
N85-12279/4/GAR PC **A02**/MF **A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Processamento Analogico de Voz Para Transmissao FM de Um Canal Telefonico (Analog Voice Processing for FM Transmission in a Telephone Channel).
N. H. Colla, and F. Violaro. Jul 83, 23p INPE-2798-PRE/359
In Portuguese; English Summary. Presented at the 35TH Reuniao Anual DA Sbpc, 6-13 Jul. 1983, Belem/PA.

A circuit for voice processing was designed to properly modify the audio signal in order to obtain a high signal-to-noise ratio with the least power consumption, by using companding and preemphasis/deemphasis. The compandor is formed by the compressor (at the transmission) and expander (at the reception). The compressor reduces the dynamic range of the speech signal power, which allows a more efficient utilization of the transmission bandwidth of the FM channel, enhancing both the signal-to-noise ratio of low signals and high signal crosstalk. The expander restores the original signal range and attenuates the intersyllabic and idle channel noise. Deemphasis, at the reception, equalizes the noise throughout the channel bandwidth. To avoid overdeviation, there is a limiter which works jointly with the compressor as a fast AGC in order to avoid intermodulation. There may be pulsed E&M line signalization, transmitted by a 3825 Hz tone. The speech signal bandwidth is from 300 Hz to 3400 Hz.

513,978
N85-12293/5/GAR PC **A07**/MF **A01**
Ecole Nationale Superieure des Telecommunications, Paris (France).
Etude sur la Conversion et le Test de Protocole (Study on the Conversion and Test of Protocols).
Ph.D. Thesis.
Y. Choi. 6 Jun 84, 132p ENST-E-84005,
Text in French.

The conversion of protocols nonadapted to the open systems interconnection (OSI) architecture into compatibility with the OSI system and the test of the equipment for converting protocols are studied. Specification and validation of protocols are reviewed. The test of the X-21 procedure and the test of the signal management equipment, parts of the Telecom project, are analyzed. A specification method based on extended finite state machines is developed. A test system for protocol conversion equipment is described.

513,979
N85-12294/3/GAR PC **A03**/MF **A01**
Uppsala Ionospheric Observatory (Sweden).
Observations and Prognosis of HF Wave Propagation Via the Sporadic E Layer.
H. Derblom. Apr 84, 32p UIO-SR-84-04
Contract FOA-304176
In Swedish; English Summary. Presented at Rvk 84, Linkoeping, Sweden.

Sporadic E propagation over a distance of 1000 km for 1 month was studied. Analysis of ionograms from a site close to the midpoint of the propagation path show that the median values of the maximum propagation observed (Es MOF) can be predicted accurately for daytime conditions. A great discrepancy between the observed and predicted values is reported for nighttime. Es MOF exceeds the maximum usable frequency (EsMUF) by several MHz. The reflection mechanism is possibly different during the night. Comparison between maximum transmission frequencies calculated by ray tracing using full wave theory, and by the secant law shows marginal differences only. Refraction in layers beneath the Es can be neglected in practical applications for EsMUF predictions.

513,980
PB85-136067/GAR
(Order as PB85-136042/GAR, PC **E05**/MF **E01**)
Mitsubishi Electric Corp., Tokyo (Japan).
Characteristics of a Mobile FM Receiver Using Switching Diversity,
T. Fukae, H. Noda, K. Taura, and Y. Tsuboi. c1984, 4p
Text in Japanese.

Included in Mitsubishi Denki Giho, V58 n10 p8-11 1984.

One of the problems faced by FM car radios is their susceptibility to severe deterioration in audio quality with Rayleigh fading. Diversity reception, a promising technique for car-borne reception, has been investigated as a countermeasure for this problem. The authors discuss comparisons they made of switching systems with two antennas and two tuners and those with a single tunor and two antennas in simulation and fied tests, establishing that both systems have comparable diversity effects.

513,981
PB85-139475/GAR PC **E09**/MF **E09**
Institute of Occupational Medicine, Edinburgh (Scotland).
Communications in Noisy Environments,
G. J. Coleman, R. J. Graves, S. G. Collier, D. Golding, and A. G. M. Nicholl. Jun 84, 175p TM/84/1, EUR/P-74

Investigations were carried out with the objectives of providing a means for improving the design of communication devices, providing guidelines for identifying potential and existing communication difficulties early in system design procedures, and minimizing potential difficulties arising from the need to wear hearing protection. These objectives were achieved by producing methods for the evaluation of non-verbal and verbal communication tailored to mining requirements.

513,982
PB85-142990 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Personal Radio Guide.
Final rept.,
J. F. Shafer. 1984, 19p
Sponsored by National Inst. of Justice, Washington, DC.
Pub. in NIJ (National Institute of Justice) Guide 203-83, 19p 1984.

This guide describes the characteristics of personal (handheld) transceivers that are currently available and discusses some of their uses and their application in law enforcement communications systems. The purpose of this guide is to provide general background information that will help law enforcement planners analyze their personal radio needs and enable them to select the best type of equipment to satisfy those needs. In addition to personal radios, the guide discusses accessory equipment such as batteries and antennas. It includes sections on design and construction, operational considerations, cost, maintenance, safety and recent improvements. Topics treated in detail include propagation and coverage, frequency availability, building penetration, battery capacity, chargers and charging techniques, and antenna performance and construction.

513,983
PB85-854529/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Color Television Receivers: Servicing, Maintenance, and Reliability. 1975-January 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
Rept. for 1975-Jan 85.
Jan 85, 237p
Supersedes PB82-871427.

This bibliography contains citations concerning techniques and equipment for servicing and maintaining color television receivers. Topics discuss the reliability of these receivers in general and with regard to some of their various components. Many citations refer to specific manufacturer's models. (This updated bibliography contains 366 citations, 165 of which are new entries to the previous edition.)

17D. Electromagnetic and Acoustic Countermeasures

513,984
PB85-854743/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electronic Countermeasures and Electronic Counter Countermeasures. June 1982-1984 (Citations from the NTIS Data Base).
Rept. for Jun 82-1984.
Jan 85, 236p
Supersedes PB84-854777.

This bibliography contains citations concerning equipment and studies of techniques for electronic countermeasures. Topics include electronic warfare, radar and radio jamming, antijamming, antiradar materials, and decoys and deception. Techniques include adaptive antennas, frequency hopping and discrimination for counter countermeasures. A few references pertain to military technical objective documents for electronic equipment operating in a hostile electromagnetic environment. Some references to smoke and fog and scavenging techniques are included for those cases where military smoke is used against ranging and targeting radars and lasers. (This updated bibliography contains 248 citations, 105 of which are new entries to the previous edition.)

17E. Infrared and Ultraviolet Detection

513,985
PB85-854487/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Forward Looking IR Detectors. 1973-1984 (Citations from the NTIS Data Base).
Rept. for 1973-1984.
Jan 85, 236p
Supersedes PB84-856293.

This bibliography contains citations concerning the design, development, and applications of forward-looking infrared detectors. Technology includes image processing, optical fabrication, contrast enhancement, and threshold evaluations. Design and development of display systems, detectors, and protective coatings are covered for various applications. The literature addresses operator interface and training, tracking techniques (including some techniques on moving target indicators), pattern recognition, target identification, reliability, and atmospheric effects. (This updated bibliography contains 253 citations, 10 of which are new entries to the previous edition.)

17F. Magnetic Detection

513,986
AD-A148 725/5/GAR PC **A03**/MF **A01**
Naval Surface Weapons Center, Silver Spring, MD.
Inexpensive Vector Thin Film Magnetometer.
Final for FY83,
P. E. Hunter, L. J. Schwee, F. G. Salton, and M. T. Shephard. 1 May 84, 49p Rept no. NSWC/TR-83-296

This report details the work performed in the 1983 fiscal year on a project oriented at producing thin film magnetometers. These sensors will prove to be very economical in mass production because of integrated circuit fabrication techniques used. The device is well characterized and its operation understood. Included in this report are data on its vector nature, linear dynamic range, biased field effects, thermal response and small field response. Finally, an application in ordnance round identification is described.

17G. Navigation and Guidance

513,987
AD-A148 748/7/GAR PC **A02**/MF **A01**
Naval Postgraduate School, Monterey, CA.

Three Position Estimation Procedures,
R. N. Forrest. Jun 84, 25p Rept no. NPS55-84-13

This report describes three position estimation procedures. The first is for estimates based on bearings taken on or from stations with uncertain locations. The second is for use with two or more lines of position. The third is combining estimates from different sources. Originator-supplied keywords include: Navigational error; Bearings-only position estimate, Bearings-only fix, Composite position estimate, Composite position fix, and Line of position fix.

513,988

AD-A148 787/5/GAR PC A03/MF A01
Army Armament Research and Development Center, Watervliet, NY. Large Caliber Weapon Systems Lab. (Field Unit).
Autonomous Navigation for Mobile Robot Vehicles Over Hilly Terrain Using Rangefinding Measurements.
Final technical rept.,
C. N. Shen. Oct 84, 38p ARLCB-TR-84033, SBI-AD-E440 251
Presented at the Robotic Intelligence and Productivity Conference, 15-19 Nov 83, Detroit, MI.

The mobile robot vehicle is equipped with data acquisition and decision making devices for its autonomous navigation over rough terrain. A laser rangefinder is chosen as principal sensing device, which can determine radial distances from the vehicle to points of unpredictable hilly terrain surfaces. The overall procedure conducted for such a design consists of the following interrelated subsystems such as scanning scheme, obstacle detection scheme, terrain slope estimation, and path selection algorithm. Stochastic processes and methods are employed throughout the analysis.

17I. Radar Detection

513,989

AD-A148 829/5/GAR PC A03/MF A01
Foreign Technology Div., Wright-Patterson AFB, OH.
Acta Electronica Sinica (Selected Articles).
Z. Youwei, Z. Guchuan, and F. Ji-Chang. 7 Nov 84, 33p Rept no. FTD-ID(RS)T-1227-84
Edited trans. of Dianzi Xuebao (China) v11 n6 p47-55, 57-63 Nov 83. See also AD-A123 934.

No abstract available.

513,990

N85-12292/7/GAR PC A02/MF A01
Ecole Nationale Superieure des Telecommunications, Paris (France).
Modelisation Autoregressive et Classification de Feuillis de Sols (Autoregressive Modeling and the Classification of Land Clutter).
J. F. Agnel. Apr 84, 18p ENST-C-84003
Text in French. Presented at Colloq. Intern. Sur le Radar, Paris, 21-24 May 1984.

Spectral analysis of the radar signatures of three types of land was performed, based on autoregressive modeling and automatic classification. An airborne radar was used on plowed fields, forest and snow. A time sequence of 128 signatures composed a sample, and 1000 samples were recorded. A maximum entropy method was used for signal analysis. Comparison between the correlation coefficients and cepstral coefficients shows that in the latter case the recognition increases from 81% to 87.5% for all types of land and from 57% to 78% in the case of forest.

18. NUCLEAR SCIENCE AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

513,991

DE85000449/GAR PC A02/MF A01
GA Technologies, Inc., San Diego, CA.
Comparison of Energy Confinement in Doublet III Limiter and Divertor Discharges with Ohmic, Neutral Beam and Electron Cyclotron Heating.
K. H. Burrell, R. Prater, S. Ejima, T. Angel, and C. J. Armentrout. Sep 84, 13p GA-A-17694, CONF-840910-17
Contract AT03-84ER51044
10. international conference on plasma physics and controlled nuclear fusion research, London, UK, 12 Sep 1984.

Scaling of total energy confinement time with line averaged density, toroidal field, plasma current and total input power is presented for vertically elongated tokamak plasmas, both limiter and divertor configurations, heated by Ohmic, neutral beam injection (NBI), and electron cyclotron heating (ECH) methods. Line averaged density plays no role in confinement in any type of discharge for densities above 2 x 10 exp 19 m exp -3 . Toroidal field affects confinement only in Ohmic divertor discharges. Current is the key variable in ECH and NBI discharges; Confinement time increases linearly with current. The similarity of the density and current scaling in NBI and ECH cases argues strongly that these scalings are properties of the auxiliary-heated plasmas in general and are not heating method specific results. Configuration also affects confinement: Expanded boundary divertor discharges show superior confinement for all three heating methods. Finally, the functional form of the variation of stored energy with input power in NBI discharges suggests that confinement time is approaching a new, power independent value at high input power. (ERA citation 10:003927)

513,992

DE85002535/GAR PC A03/MF A01
Lawrence Livermore National Lab., CA.
Single Stream Analysis of the Cryopanel and Piping Free Convection Loop for MFTF-B.
B. R. Bowman, S. B. Sutton, and M. A. Lane. 17 Aug 84, 50p UCID-20249
Contract W-7405-ENG-48
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A one-dimensional model is developed for the two-phase free convection flow of liquid helium in the cryopanel loops of MFTF-B. The conservation equations for mass, momentum and energy are solved using a finite element collocation algorithm PDECOL. Suitable boundary conditions are developed for the system and the equations-of-state for liquid and vapor helium are incorporated. Both the east and the west ends of the cryopanel systems are analyzed to determine the maximum vapor fraction that will occur when the panels are subjected to a 30 s heat pulse. A single loop is considered for each end which consists of the supply piping from the helium dewar, the internal piping to two cryopanels placed in series and the cryopanels themselves. A steady heat load is applied to the system which has estimates of pressure, temperature, velocity, and density as initial input. Once the calculation has reached a steady-state condition, the heat input to the cryopanels is doubled for thirty seconds then returned to its steady-state value. Results are presented as plots of pressure, velocity, mixture density, mixture enthalpy and mixture quality versus the axial coordinate along the pipe system. (ERA citation 10:003030)

513,993

N85-12695/1/GAR PC A04/MF A01
UKAEA Atomic Energy Research Establishment, Harwell (England).
Review: Role of Refractory Metal Alloys in Fusion Reactor Applications.
D. J. Mazey, and C. E. English. Jun 84, 69p AERE-R-11317
Sponsored in Part by Culham/Euratom Fusion Association.

The role of the refractory metal alloys is considered in relation to their possible application for future thermonuclear fusion reactor systems. Assessment of the availability and properties of the refractory metals indicates that alloys of V, Nb, and Mo are most likely to play a major role in reactor systems. The operating environment of a fusion reactor and the materials constraints that are imposed by radiation damage effects and plasma-wall interactions are considered briefly. The metallurgical aspects of the refractory metals and their alloys are then reviewed, followed by an assessment of the existing data base on the effects of neutron and ion irradiation on physical and mechanical properties. Consideration is also given to the effect of specific environments on alloy properties and to the industrial base and availability of refractory metal alloys. The review concludes with a brief summary in which it is proposed that alloys based on vanadium offer the best potential for long-term fusion reactor applications for reasons of low induced radioactivity and good structural stability under irradiation.

18B. Isotopes

513,994

N85-12668/8/GAR PC A03/MF A01
International Atomic Energy Agency, Vienna (Austria).
Isotopes in Day to Day Life.
Jun 84, 35p IAEA/PI/A.6E-84-00924
Original Contains Color Illustrations.

Developments are reported in the use of isotopic labeling and isotope irradiation in agriculture, medical science, hydrology, geochemistry, geophysics, environment pollution detection, and industries. Radioisotope instruments are described as well as techniques for gamma radiography, neutron radiography, and autoradiography. Isotope dating in geology and archaeology is covered. Basic scientific research topics in various areas are listed.

18C. Nuclear Explosions

513,995

AD-A148 765/1/GAR PC A03/MF A01
Teledyne Geotech, Alexandria, VA. Alexandria Labs.
Use of P Coda for Explosion Medium and Improved Yield Determination.
Technical rept.,
I. N. Gupta, R. R. Blandford, R. A. Wagner, J. A. Burnetti, and T. W. McElfresh. 16 Mar 84, 48p Rept no. TGAL-TR-83-7A
Contract F08606-84-C-0009

Spectral analyses of P and P coda on teleseismic recordings of nuclear explosions at Yucca Flats and Pahute Mesa regions of the Nevada Test Site (NTS) seem to provide explosion source medium information. The spectral ratio P/P-coda on short-period vertical component records at NORSAR shows positive correlation with explosion medium velocity. It seems that the initial P from generally shallower explosions within a low velocity medium experiences significantly lower scattering Q (and perhaps also inelastic Q) as compared to generally deeper explosions in a high velocity medium. Near-source scattering of explosion-generated Rayleigh waves into teleseismic P also appears to play an important role. (Author)

18D. Nuclear Instrumentation

513,996
DE85001648/GAR PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Detectors for High Energy Nucleus-Nucleus Collisions.
L. S. Schroeder. Aug 84, 28p LBL-18310, CONF-8406189-4
Contract AC03-76SF00098
International conference on ultrarelativistic nucleus-nucleus collisions - QUARK MATTER '84, Helsinki, Finland, 17 Jun 1984.
Portions are illegible in microfiche products.

The Workshop on Detectors for Relativistic Nuclear Collisions, held March 26 to 30, 1984, at the Lawrence Berkeley Laboratory is reviewed. 21 references. (ERA citation 10:003149)

513,997
PB85-138790/GAR PC **E04**/MF **E04**
Science and Engineering Research Council, Chilton (England). Rutherford Appleton Lab.
Electronic Readout System Used on the MK II R.A.L. (Rutherford Appleton Laboratory) Positron Camera,
R. Stephenson. c1984, 73p RAL-84-063

This paper describes the operating principles of the electronic readout system as used on the MK II R.A.L. positron camera. Active area 600 * 300 mm. It describes the individual modules in detail, giving specifications and performance figures for the individual units, and of the complete system. It presents some early results obtained with the full system. (Copyright (c) Science and Engineering Research Council 1984.)

513,998
PB85-140663 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Measurement of the (235)U Mass in a Large Volume Multiplated Fission Ionization Chamber.
Final rept.,
O. A. Wasson, and M. M. Meier. 1981, 12p
Pub. in Nuclear Instruments and Methods 190, n3 p571-582, 15 Dec 81.

The mass of (235)U contained in a large-volume multideposit fission ionization chamber used for neutron cross section experiments was measured relative to the National Bureau of Standards reference deposit 25S-2-1. The mass ratio used the thermal neutron induced fission reaction in a uniform 25 cm diameter neutron beam from the thermal column of the NBS reactor. The mass was independent of the geometrical area and areal density variation of the deposits, absolute neutron flux, thermal neutron energy distribution, and neutron cross sections. The (235)U mass in the chamber is 0.1709 g with a one standard deviation uncertainty of 1.2%.

513,999
PB85-141372 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Design and Calibration of an Absolute Flux Detector for 1-15 MeV Neutrons.
Final rept.,
M. S. Dias, R. G. Johnson, and O. A. Wasson. 1984, 14p
Pub. in Nuclear Instruments and Methods in Physics Research 224, p532-546 1984.

An absolute neutron flux monitor having fast timing and a calculable response has been developed for use in a collimated beam of 1-15 MeV neutrons. The detector consists of dual thin plastic scintillators in which the proton recoil spectrum distortion caused by the escape of protons from the first scintillator is eliminated experimentally. The absolute detector efficiency was measured at 2.45 and 14.0 MeV neutron energies using the associated-particle technique at the NBS Positive-Ion Van de Graaff facility. The efficiency and pulse height distributions were calculated using a Monte Carlo based program in order to extend the efficiency throughout the 1-15 MeV interval. The uncertainty in the efficiency is 1-2% (1 standard deviation).

18E. Nuclear Power Plants

514,000
DE85001204/GAR PC **A99**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
INEL (Idaho National Engineering Laboratory) Environmental Characterization Report. Volume II. Appendices A-D.
Sep 84, 910p EGG-NPR-6688-V.2-App.A-D
Contract AC07-76ID01570
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This volume contains appendices: (1) a socioeconomic data base for southeastern Idaho; (2) an ecological characterization of the INEL; (3) site-specific climatology summary, NPR primary and alternate sites; (4) NPR site borehole completion; (5) an investigation of the principal lineament at the INEL; (6) an investigation of Clay Butte, Idaho; (7) Arco and Howe fault study; (8) seismology of the INEL; (9) geologic map of the INEL; and (1) geologic ages of the INEL. (ERA citation 10:003343)

514,001
NUREG-0750-V20-N3/GAR PC **A12**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Technical Information and Document Control.
Nuclear Regulatory Commission Issuances, September 1984.
Sep 84, 267p
See also NUREG-0750-V20-N2.

This report includes the issuances received during the specified period from the Commission (CLI), the Atomic Safety and Licensing Appeal Boards (ALAB), the Atomic Safety and Licensing Boards (LBP), the Administrative Law Judge (ALJ), the Directors' Decisions (DD), and the Denials of Petitions for Rulemaking (DPRM).

18F. Radiation Shielding and Protection

514,002
PB85-136265 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Effect of Phantom Geometry on the Conversion Factor from Exposure to Absorbed Dose.
Final rept.,
M. Ehrlich, and C. G. Soares. 5 Mar 84, 3p
Pub. in Radiation Protection Dosimetry 8, n4 p261-263, 5 Mar 84.

The conversion factors from exposure to absorbed dose in water phantoms of slab and spherical geometries are deduced from TLD measurements in polymethylmethacrylate phantoms, for photon energies between about 20 keV and 1.25 MeV, and for shallow and deep depths in the phantoms. The conversion factors measured in the slab are found to exceed those measured in the sphere by at most 10 percent for the shallow depth and by somewhat less for the deep depth. The effect is most pronounced for photon energies between 80 and 140 keV. The results are compared with those deduced from calculations and measurements available in the literature.

18G. Radioactive Wastes and Fission Products

514,003
DE85000007/GAR PC **A05**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Radiology and Radiation Biology.
Intrusion of Soil Covered Uranium Mill Tailings by Whitetail Prairie Dogs and Richardson's Ground Squirrels.
R. Shuman. 1984, 83p DOE/EV/10305-14
Contract AC02-79EV10305
Thesis.

The primary objective of the reclamation of uranium mill tailings is the long-term isolation of the matrial from the biosphere. Fossorial and semi-fossorial species represent a potentially disruptive influence as a result of their burrowing habits. The potential for intrusion was investigated with respect to two sciurids, the whitetail prairie dog (Cynomys leucurus) and Richardson's ground squirrel (Spermophilus richardsonii). Populations of prairie dogs were established on a control area, lacking a tailings layer, and two experimental areas, underlain by a waste layer, in southeastern Wyoming. Weekly measurements of prairie dog mound surface activities were conducted to demonstrate penetration, or lack thereof, of the tailings layer. Additionally, the impact of burrowing upon radon flux was determined. Limited penetration of the waste layer was noted after which frequency of inhabitance of the intruding burrow system declined. No significant changes in radon flux were detected. In another experiment, it was found that Richardson's ground squirrels burrowed to less extreme depths when confronted by mill tailings. Additional work at an inactive tailings pile in western Colorado revealed repeated intrusion through a shallow cover, and subsequent transport of radioactive material to the ground surface by prairie dogs. Radon flux from burrow entrances was significantly greater than that from undisturbed ground. Data suggested that textural and pH properties of tailings material may act to discourage repeated intrusion at some sites. 58 references. (ERA citation 10:003329)

514,004
DE85000675/GAR PC **A04**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Effect of Host-Rock Dissolution and Precipitation on Permeability in a Nuclear Waste Repository in Tuff.
J. W. Braithwaite, and F. B. Nimick. Sep 84, 57p
SAND-84-0192
Contract AC04-76DP00789

A study has been conducted to determine whether thermally induced, host-rock mineral dissolution and precipitation processes could decrease the isolation capability of a potential high-level nuclear waste repository in tuff by significantly altering the permeability of the formation. Conservative assumption and precipitation. Porosity changes were calculated as a function of time, depth, emplaced waste power density, and water flux for both matrix and fracture flow. Cumulative porosity changes were shown to be very small, and net decreases in porosity were shown to occur only in the vicinity of the repository horizon if the groundwater vaporizes. The differences in permeability for both matrix and fracture flow resulting from these small cumulative porosity were shown to occur only in the vicinity of the repository horizon if the groundwater vaporizes. The differences in permeability for both matrix and fracture flow resulting from these small cumulative porosity changes should have no significant effect on the overall hydrologic patterns at the site at Yucca Mountain, Nevada. 40 references, 16 figures, 4 tables. (ERA citation 10:001332)

514,005
DE85002009/GAR PC **A02**/MF **A01**
UNC Nuclear Industries, Inc., Richland, WA.
Evaluation of Nuclear Facility Decommissioning Projects Program: Status.
B. L. Baumann. 20 Sep 84, 8p UNI-SA-132, CONF-8410142-2
Contract AC06-76RL01857
12. water reactor safety research information meeting, Gaithersburg, MD, USA, 23 Oct 1984.

In recent years major studies have been undertaken by the US Nuclear Regulatory Commission (NRC) and others concerning the technology, safety, and costs associated with decommissioning nuclear facilities. The Evaluation of Nuclear Facility Decommissioning Projects (ENFDP) program described in this presentation is being undertaken by the NRC to compile and evaluate the activities of ongoing decommissioning projects. Assessment and evaluation of the methods, impacts, radiation exposure, and costs will provide a basis for evaluating licensee's decommissioning proposals and for future decommissioning direction and regulation. (ERA citation 10:002280)

514,006
DE85002410/GAR PC **A02**/MF **A01**
Los Alamos National Lab., NM.

Irradiation-Induced Reduction of Microcracking in Zirconolite.
F. W. Clinard, D. S. Tucker, G. F. Hurley, C. D. Kise, and J. Rankin. 1984, 9p LA-UR-84-3383, CONF-841157-8
Contract W-7405-ENG-36
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1984.

sup 238 Pu-substituted zirconolite (CaPuTi sub 2 O sub 7) was stored near ambient temperature for 231 days, equivalent to an alpha decay dose of 3.1x10 exp 25 alpha /m exp 3 or 3x10 exp 5 years of storage time for SYNROC ceramic nuclear waste. Periodic indentation testing showed that hardness was decreased by alpha decay-induced conversion to the metamict state, while fracture toughness and resistance to cracking were increased, apparently as a consequence of the formation of a heterogeneous microstructure. These results imply improved stability of this nuclear waste phase as a result of self-irradiation damage. 21 references, 4 figures. (ERA citation 10:002734)

18H. Radioactivity

514,007
DE81027154/GAR PC$12.00/MF A01
Oak Ridge National Lab., TN.
Models and Parameters for Environmental Radiological Assessments.
Critical review series.
C. W. Miller. 1984, 157p ISBN-0-87079-517-1, DOE/TIC-11468
Contract DE-AC05-84OR21400
Library of Congress catalog card no. 84-14255.

Currently, a number of environmental transport and dose calculation models that employ different data bases and assumptions are available to assess the radiological impact of routine and accidental discharges. Objectives of the model evaluation project initiated at Oak Ridge National Laboratory (ORNL) are identification of these models; evaluation of the structure, the simplifying assumptions, and the data bases of the models; estimation of uncertainties identified with the models; and, if possible, recommendation of the models and parameters best suited to particular assessment situations. Models examined in this project to date include those developed for the prediction of atmospheric and hydrologic transport and deposition, for terrestrial and aquatic food-chain bioaccumulation, and for internal and external dosimetry. This book presents models and parameters deemed appropriate for assessing the impact of radioactive discharges to the environment.

514,008
DE84702894/GAR PC A02/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Techniques for Radon Measurements in Soils and Thermal Waters.
G. N. Flerov, S. P. Tret'yakova, L. V. Dzholos, M. S. Pazylov, and A. N. Sultankhodzhaev. 1983, 8p JINR-18-83-388
In Russian.
U.S. Sales Only.

The possibilities of using dielectric detectors to record variations of radon concentration in soils and in underground waters are investigated. The technique for measuring soil radon was chosen using two geometries. It has been noted that there is some regularity in the variations of the track density depending on the calendar time and on the atmospheric conditions. It is shown that track detectors are capable of registering radon in soil and in thermal waters reliably and that the difference between the track densities at the centre and in the periphery of abyssal fractures permits the accurate location of tracks and the determination of the point to observe changes in radon concentration. The comparison of the results leads to the conclusion that the exposure time should be reduced and the number of points for systematic observation should be increased. (Atomindex citation 15:041972)

514,009
DE85000009/GAR PC A03/MF A01
Colorado State Univ., Fort Collins. Dept. of Radiology and Radiation Biology.
Leachability of sup 226 Ra from Spiked Soil as a Function of Time.
E. J. Deming. Oct 83, 32p DOE/EV/10305-13
Contract AC02-79EV10305
Thesis.
Portions are illegible in microfiche products.

The bioavailability of sup 226 Ra for plant uptake may be dependent on its solubility from the soil components. Solubility of radium from soil may change with time due to chemical and physical binding. A laboratory study was designed to provide data on the water leachable fraction of sup 226 Ra from spiked soil as a function of time. A decreasing trend in the percent leachable fraction was observed over time. The data was modeled by non-linear regression to be a decreasing exponential to a constant value. This information may be helpful in providing an understanding of a similar trend observed in plant uptake studies. The value for the available amount of radium determined in this investigation may help to provide a more meaningful measurement of concentration ratios in plants. 22 references, 3 figures, 5 tables. (ERA citation 10:003328)

514,010
DE85000010/GAR PC A04/MF A01
Colorado State Univ., Fort Collins. Dept. of Radiology and Radiation Biology.
Effects of Barium Chloride Treatment of Uranium Mill Tailings and Ore on Radon Emanation and sup 226 Ra Levels. Progress Report.
S. A. Ibrahim, and S. L. Flot. 30 Nov 83, 63p DOE/EV/10305-12
Contract AC02-79EV10305
Thesis.

The purpose of this study was to investigate the effect of barium chloride treatments on: reduction of sup 222 Rn emanation from mill wastes; reduction of sup 226 Ra levels in wastewater; and decreased leachability of sup 226 Ra from mill wastes. Baseline sup 226 Ra concentrations were determined for ore and tailings as well as radon emanation fractions. Uranium ore was treated with soluble barium at concentrations of 10, 25, 50, and 100 mg per litre of slurry. The leach-liquor declined in sup 226 Ra concentration by as much as 50%. When soluble potassium as well as barium was used in the treatment process at equal concentrations of 10, 25, 50, and 100 mg per litre of slurry, a similar reduction was observed. No significant difference was noted between the two treatment regimes. An accelerated leaching experiment was performed on the ore treated with barium chloride. All treatment groups except that treated with 10 mg of soluble barium per litre of slurry showed significant decreases in leachability. Available sup 222 Rn (corresponds with radon emanation fraction) was measured in treated and untreated ore. Ore treated with concentrations of Ba exp ++ up to 1.00 mg per gram of ore did not show a statistically significant reduction in available sup 222 Rn, however when potassium sulfate was also added, a significant decline was noted. This study suggests that barium chloride treatments reduce radon emanation from mill wastes and reduce sup 226 Ra levels in wastewater. Leachability of exp 226 Ra from treated samples decreased markedly. 19 references, 8 figures, 7 tables. (ERA citation 10:003327)

514,011
DE85000021/GAR PC A05/MF A01
Lamont-Doherty Geological Observatory, Palisades, NY.
Plutonium, Cesium, Uranium and Thorium Series Radionuclides in the Hudson River Estuary and Other Environments. Annual Technical Progress Report, December 1, 1983-November 30, 1984.
H. J. Simpson, R. M. Trier, and R. F. Anderson.
1984, 90p DOE/EV/12529-26, COO-2529-26
Contract AC02-76EV12529
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Radionuclide activities were measured in sediment cores and suspended particle samples from the Hudson River estuary. Activities of sup 137 Cs, sup 134 Cs, and sup 60 Co, sup 239 sup 240 Pu and sup 238 Pu indicate rapid accumulation in marginal cove areas, and very rapid deposition in the harbor adjacent to New York City, resulting in sup 239 sup 240 Pu accumulations of more than an order of magnitude greater than the fallout delivery rate. Fallout sup 239 sup 240 Pu moving downstream appears to be retained within the system by particle deposition, while more than 50% of the sup 137 Cs derived from both reactor releases and fallout has been exported. Significant movement of dissolved plutonium into the estuary from adjacent coastal waters may be occurring. Depth profiles of radionuclides are not significantly altered by physical mixing processes in areas accumulating particles at greater than 1 cm/yr. Transport of fallout radionuclides appears to have decreased faster than would be calculated from continuous removal from a well-mixed soil reservoir, indicating that sequestering of a substantial portion of the soil fallout burden has occurred in the watershed soils over the past two decades. Measurements of fallout sup 239 sup 240 Pu in a saline lake with a high carbonate ion concentration yielded water column activities two orders of magnitude greater than that found for fallout plutonium in other continental waters, indicating extensive mobility in some natural water environments. Experiments using lake water suggest that carbonate ions are likely to be important in regulating plutonium solubility in some environments and that low molecular weight complexes are primarily responsible for enhanced plutonium solubility. 45 references, 17 figures, 14 tables. (ERA citation 10:003363)

514,012
DE85000266/GAR PC A03/MF A01
Oak Ridge National Lab., TN.
Significance of Environmental Exposure Pathways for Technetium.
F. O. Hoffman, R. H. Gardner, and S. M. Bartell.
1984, 31p CONF-8410157-2
Contract AC05-84OR21400
Scientific seminar on the behavior of technetium in the environment, Cadarache, France, 23 Oct 1984.
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Numerical simulation techniques are used to produce a probable range of predicted values from estimates of uncertainty assigned to the parameters of radiological assessment models. This range is used to indicate the uncertainty in the model's prediction. The importance of individual parameters and exposure pathways is determined by their relative contribution to this simulated uncertainty index. The major pathways of exposure to humans resulting from the airborne emissions of exp 99 Tc involve the consumption of vegetables, vegetable products, and poultry eggs. The most important model parameters are related to the mobility of exp 99 Tc in soil, the incorporation of exp 99 Tc into the edible portions of crops, its transfer from vegetation to poultry eggs, and its atmospheric deposition. Uncertainty in the dose for individuals exposed to exp 99 Tc-contaminated liquid discharges is dominated by the bioaccumulation of this isotope in aquatic food chains and by the possibility that contaminated surface water will be used as a source of drinking water. Results suggest that future reductions in the present estimates of uncertainty will lead to the dismissal of exp 99 Tc as an environmentally important radionuclide, provided that de minimis dose levels are eventually adopted and releases of exp 99 Tc from individual nuclear fuel cycle facilities will not be substantially larger than 1 Ci/year to the atmosphere and 100 Ci/year to the aquatic environment. These conclusions do not account for the possibility of a large long-term accumulation and remobilization of exp 99 Tc in aquatic sediment and/or surface soils. 32 references, 9 tables. (ERA citation 10:003322)

514,013
DE85000274/GAR PC A02/MF A01
Oak Ridge National Lab., TN.
Behavior of Technetium in Freshwater Environments.
B. G. Blaylock, M. L. Frank, F. O. Hoffman, and D. L. DeAngelis. 1984, 18p CONF-8410157-1
Contract AC05-84OR21400
Scientific seminar on the behavior of technetium in the environment, Cadarache, France, 23 Oct 1984.
Portions are illegible in microfiche products.

In a previous study, /sup 95m/Tc, as a pertechnetate, was released to a small, experimental, freshwater pond, and the concentrations were determined in biotic and abiotic components of the pond ecosystem. A simple mathematical model was developed to predict the concentration of /sup 95m/Tc in fish and snails. Results from this study indicated that uptake through the food chain was an important source of technetium to the higher trophic levels (i.e., fish). In the current study, an experimental pond was spiked with / sup 95m/Tc in the pertechnetate form, and the concentrations of /sup 95m/Tc were measured in the lower trophic levels. Emphasis was placed on measuring the concentration of /sup 95m/Tc in zooplankton, benthic invertebrates, and the aquatic macrophyte

Elodea canadensis. Fish were excluded from the pond to allow the development of a large zooplankton population. The concentration of /sup 95m/Tc in water decreased from 0.75 Bq/mL 1 h after the pond was spiked, to 0.21 Bq/mL at 20 d. Throughout the experiment, at least 98% of the /sup 95m/Tc in the water was in the dissolved fraction (0.4 mu m). Zooplankton accumulated /sup 95m/Tc rapidly, having concentration factors (Bq/g sample wet wt. divided by Bq/g water) ranging from 3 at 4 h to 36 at 20 d. Concentration factors ranged from 3 to 8 for benthic insects and from 1 to 62 for the aquatic macrophyte. (ERA citation 10:003362)

514,014
DE85000550/GAR PC **A03**/MF **A01**
Oak Ridge Associated Universities, Inc., TN.
Determination of the Radiation from an Orange Fiestaware Cup.
E. A. Thompson. 1984, 40p DOE/OR/00033-T76
Contract AC05-76OR00033
Thesis. Submitted to Pittsburgh Univ., PA.
Portions are illegible in microfiche products.

The potential hazard of a cup decorated with an uranium-containing glaze was determined. The radiation dose was measured by taping film badges to the cup for 24 hours. It was concluded there was no significant health hazard. The only potentially hazardous exposure would be to beta radiation, and direct contact for 20 h/day would be required to reach occupational exposure limits. 16 references, 8 figures, 8 tables. (ERA citation 10:003330)

514,015
DE85002456/GAR PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Effects of Particle Size and Velocity on Burial Depth of Airborne Particles in Glass Fiber Filters.
D. P. Higby. Nov 84, 62p PNL-5278
Contract AC06-76RL01830
Thesis. Submitted to Univ. of Washington, Seattle.

Air sampling for particulate radioactive material involves collecting airborne particles on a filter and then determining the amount of radioactivity collected per unit volume of air drawn through the filter. The amount of radioactivity collected is frequently determined by directly measuring the radiation emitted from the particles collected on the filter. Counting losses caused by the particle becoming buried in the filter matrix may cause concentrations of airborne particulate radioactive materials to be underestimated by as much as 50%. Furthermore, the dose calculation for inhaled radionuclides will also be affected. The present study was designed to evaluate the extent to which particle size and sampling velocity influence burial depth in glass-fiber filters. Aerosols of high-fired sup 239 PuO sub 2 were collected at various sampling velocities on glass-fiber filters. The fraction of alpha counts lost due to burial was determined as the ratio of activity detected by direct alpha count to the quantity determined by photon spectrometry. The results show that burial of airborne particles collected on glass-fiber filters appears to be a weak function of sampling velocity and particle size. Counting losses ranged from 0 to 25%. A correction that assumes losses of 10 to 15% would ensure that the concentration of airborne alpha-emitting radionuclides would not be underestimated when glass-fiber filters are used. 32 references, 21 figures, 11 tables. (ERA citation 10:003307)

514,016
DE85002510/GAR PC **A07**/MF **A01**
Rockwell International, Richland, WA. Rockwell Hanford Operations.
Rockwell Hanford Operations Environmental Surveillance Annual Report. Calendar Year 1983.
A. W. Conklin. Aug 84, 135p RHO-HS-SR-83-13-Rev.1P
Contract AC06-77RL01030
Portions are illegible in microfiche products.

Rockwell Hanford Operations (Rockwell) manages the fuel reprocessing and radioactive waste management facilities in the 200 Areas (or Separations Area) and maintains the retired radioactive dry waste disposal sites in the 600 Area. The Hanford Site is located within the Pasco Basin in southeast Washington State, approximately 270 km southeast of Seattle and 200 km southwest of Spokane. The 200 Areas are approximately in the center of the Hanford Site, 11 km south of the Columbia River. This report describes Rockwell environmental surveillance results and activities during calendar year 1983. Radionuclide concentrations in air and water are compared with the Table II Concentration Guidelines of DOE Order 5480.1, Chapter XI (DOE, 1981). In addition, all Rockwell environmental radiation data are compared, where applicable, with background data obtained by the Pacific Northwest Laboratory (PNL) environmental surveillance program. 13 references, 56 figures, 23 tables. (ERA citation 10:003336)

514,017
DE85002566/GAR PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Analysis of Uncertainties in CRAC2 Calculations: The Inhalation Pathway.
G. G. Killough, and D. E. Dunning. 1984, 24p CONF-8409169-1
Contract AC05-84OR21400
Society for Risk Analysis annual meeting, Knoxville, TN, USA, 30 Sep 1984.
Portions are illegible in microfiche products.

CRAC2 is a computer code for estimating the health effects and economic costs that might result from a release of radioactivity from a nuclear reactor to the environment. This paper describes tests of sensitivity of the predicted health effects to uncertainties in parameters associated with inhalation of the released radionuclides. These parameters are the particle size of the carrier aerosol and, for each element in the release, the clearance parameters for the lung model on which the code's dose conversion factors for inhalation are based. CRAC2 uses hourly meteorological data and a straight-line Gaussian plume model to predict the transport of airborne radioactivity; it includes models for plume depletion and population evacuation, and data for the distributions of population and land use. The code can compute results for single weather sequences, or it can perform random sampling of weather sequences from the meteorological data file and compute results for each weather sequence in the sample. For the work described in this paper, we concentrated on three fixed weather sequences that represent a range of conditions. For each fixed weather sequence, we applied random sampling to joint distributions of the inhalation parameters in order to estimate the sensitivity of the predicted health effects. All sampling runs produced coefficients of variation that were less than 50%, but some differences of means between weather sequences were substantial, as were some differences between means and the corresponding CRAC2 results without random sampling. Early injuries showed differences of as much as 1 to 2 orders of magnitude, while the differences in early fatalities were less than a factor of 2. Latent cancer fatalities varied by less than 10%. 19 references, 6 figures, 3 tables. (ERA citation 10:003460)

514,018
DE85002783/GAR PC **A04**/MF **A01**
Environmental Monitoring Systems Lab., Las Vegas, NV.
Nevada Test Site Experimental Farm: Summary Report 1963-1981.
S. C. Black, and D. D. Smith. Aug 84, 64p DOE/DP/00539-052, EPA-600/4-84-066
Contract AI08-76DP00539

This report summarizes the findings from experiments conducted at the Experimental Dairy Farm located on the Nevada Test Site. These experiments included the air-forage-cow-milk transport of the radioiodines, and the metabolism and milk transfer of other fission products and several actinides. Major studies are listed in chronological order from 1964 to 1978 and include the purpose, procedures, isotopes used, and findings for each such study. Animal exposures occurred from fallout, from artificial aerosol generation, and from oral or intravenous administration. A complete bibliography and references to published reports of the experiments are included. The findings from the radioisotope studies at the Experimental Dairy Farm and the results obtained from the Animal Investigation Program provide a rationale for making predictions and for planning protective actions that could be useful in emergency response to accidental contaminating events where fresh fission products are involved. 61 references. (ERA citation 10:003325)

514,019
DE85900132/GAR PC **A03**/MF **A01**
Institute of Nuclear Energy Research, Lung-Tan (Taiwan). Technical Information Center.
SKYSHINE-P: A Point Kernel Computer Program for Calculating SKYSHINE Exposure Rates.
D. P. Chou, T. P. Hsiao, and G. H. Lai. Feb 83, 28p INER-0498
In Chinese.
U.S. Sales Only. Portions are illegible in microfiche products.

A simple point kernel model for air-scattered gamma-rays is presented. Exposure rates arising from a vertically collimated point source are calculated by SKYSHINE-P. The results are shown to be in good agreement with benchmark experimental data while proper buildup factors have been used. (ERA citation 09:050929)

514,020
N85-12502/9/GAR PC **A02**/MF **A01**
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
Um Sistema Para Monitoracao Do Radonio E Seus Produtos de Decaimento NA Atmosfera (A System for Monitoring Radon and Its Decay Products in the Atmosphere).
E. B. Pereira, D. J. R. Nordemann, A. M. Takashima, L. S. V. Dutra, and S. L. M. Neto. Apr 84, 22p INPE-3085-PRE/494
In Portuguese; English Summary. Submitted for Publication Sponsored in Part by Fundo Nacional de Desenvolvimento Cientifico E Tecnologico.

A device to simultaneously measure the radon content of the atmosphere and its decay products associated with the atmospheric aerosols is described. The random daughters isotopes are precipitated through an electrostatic field onto an alpha particles detector which is also the collecting electrode. Either total counting or spectral analysis can be obtained as output date. The decay products of radon associated to the aerosols are measured in membrane filters after collecting the atmospheric aerosols within a given sampling time interval. Some preliminary performance results are reported.

514,021
PB85-137446 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
National Bureau of Standards Rocky Flats Soil Standard Reference Material.
Final rept.,
K. G. W. Inn, W. S. Liggett, and J. M. R. Hutchinson. 1984, 8p
Pub. in Nuclear Instruments and Methods in Physics Research 223, p443-450 1984.

The National Bureau of Standards (NBS) in collaboration with a number of environmental laboratories of the ICRM has recently issued a soil standard certified for radionuclidic concentrations of activation and fission products and natural radionuclides. Initial disagreements between laboratories of measured concentrations have led to a careful examination of the characteristics of the sample and the radiochemical procedures employed by the participants. A number of assay problems were identified and are discussed. The sample was found to contain an average of approximately 1.8 'hot' (239 + 240)Pu) particles per bottle of 90 g of soil. A statistical analysis of over seventy measurements was used to determine that the homogeneity of the material excluding hot particles is satisfactory. A sampling method for using this material for quality control of plutonium measurements which minimizes the effect of hot particles is described.

514,022
PB85-137768 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Development of a Regenerative Radon-in-Water Radioactivity Standard.
Final rept.,
J. M. R. Hutchinson, P. A. Mullen, and R. Colle. 1984, 7p
Pub. in Nuclear Instruments and Methods in Physics Research 223, p451-457 1984.

NBS has developed a prototype standard that generates samples of radium-free (222)Rn gas dissolved in distilled water. This standard is intended to be used for quality control of the U.S. Environmental Protection Agency's program to survey drinking water. It consists of a generator and delivery system which can accurately dispense solutions of (222)Rn with known concentration into, for example, a liquid scintillation vial containing scintillation cocktail. The prototype consists

of a source of (226)Ra which is deposited on an ion exchange filter and sandwiched between two layers of thin polyethylene tape and immersed in water in a specially constructed accumulation chamber. The chamber is then flushed and (222)Rn is allowed to accumulate for a measured time and flushed again into a large syringe from which the standard solution is dispensed. From the measurements made at NBS over the past two years, the (222)Rn in the ion exchange filter-polyethylene sandwich, and therefore, the concentration of radon dissolved in the water, can be predicted accurately. Other characteristics of the system will be reported.

514,023
PB85-143923 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Reflection of 252Cf Fission Neutrons from a Concrete Floor.
Final rept.,
L. Linpei. 1983, 5p
Pub. in Radiation Protection Dosimetry 5, n4 p227-231 1983.

The effect of (252)Cf fission neutrons reflected from a concrete floor, on the response of (235)U in a NBS fission chamber was measured. It was found that the reflected neutrons contribute 0.12% of the response at the usual source detector distance of 5 cm. By varying the source height above the floor, the author found that relative contributions of reflected neutrons were as high as 300%. It was found that the contribution from reflected neutrons varies as the inverse square of the distance of the detector from the image source created by regarding the floor as a mirror.

514,024
PB85-148047 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Basic Radionuclide Measurements at the U.S. National Bureau of Standards.
Final rept.,
D. D. Hoppes. 1984, 9p
Pub. in Environment International 10, p99-107 1984.

Methods presently used for the direct measurement of the activity of radionuclides are summarized. The application of these and other methods to the basic calibrations maintained in the Radioactivity Group at the U.S. National Bureau of Standards are then examined, with short descriptions of some of the available instruments. Calibration methods and uncertainties are given for 79 radionuclides.

514,025
PB85-148054 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Statistical Assessment of Subsampling Procedures.
Final rept.,
W. S. Liggett, K. G. W. Inn, and J. M. R. Hutchinson. 1984, 9p
Pub. in Environment International 10, p143-151 1984.

As shown by the examples in this paper, the concentrations in subsamples are not necessarily independently and normally distributed despite vigorous grinding and mixing of the original sample. Studies of the statistical properties of subsample concentrations should test for deviations from independence and normality and, if deviations are found, should model the observed distribution. The tests include an analysis of variance to check for less variation among nearby subsamples than among widely spaced subsamples, as well as the computation of the probability plot correlation coefficient to check for nonnormality. These tests are illustrated with (239)Pu + (240)Pu measurements on subsamples prepared for use as standard reference materials. These materials are used in quality assurance for environmental radioactivity measurements.

514,026
PB85-148096 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Radioactivity Standards for Environmental Monitoring. 2.
Final rept.,
K. G. W. Inn, P. A. Mullen, and J. M. R. Hutchinson. 1984, 7p
See also PB-290 521. Sponsored by Department of Energy, Washington, DC., Environmental Protection Agency, Washington, DC., and Nuclear Regulatory Commission, Washington, DC.
Pub. in Environment International 10, p91-97 1984.

The current environmental-monitoring-standards efforts of the low-level radioactivity laboratory in the Radioactivity Group of the National Bureau of Standards are described. The calibration efforts include traceability programs, natural-matrix Standard Reference Materials, alpha-particle-emitting standards, and international radioactivity intercomparisons. New radiometrology efforts under development include a prototype radon-222 in water standard, gamma-ray emission-rate measurement techniques in the 60-keV region, and atom-counting techniques for radioactivity measurements.

18I. Reactor Engineering and Operation

514,027
NUREG/CR-3911-V1/GAR PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Evaluation of Welded and Repair-Welded Stainless Steel for LWR (Light Water Reactor) Service, Quarterly Report January-March 1984,
D. G. Atteridge, S. M. Bruemmer, and R. E. Page. Nov 84, 28p PNL-5181-VOL-1

The Division of Engineering Technology, U.S. Nuclear Regulatory Commission, is sponsoring a program at Pacific Northwest Laboratory to evaluate welded and repair-welded stainless steel piping for light-water reactor (LWR) service. Stainless steels often become sensitized, or less resistant to stress corrosion cracking (SCC), after undergoing heating and cooling cycles such as those encountered in welding. The weld heat-affected zone (HAZ) is often the site of crack initiation. This program will therefore measure and model the development of a sensitized microstructure and its resultant resistance to SCC in welded and repair-welded stainless steel pipe. The result will be a method to assess the effects of welding variables on the SCC susceptibility of component-specific nuclear reactor welds/repairs. The progress achieved toward this objective during January - March 1984 is described in this report.

514,028
NUREG/CR-3923/GAR PC **A11**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Test Series 1: Seismic-Fragility Tests of Naturally-Aged Class 1E Gould NCX-2250 Battery Cells,
L. L. Bonzon, D. B. Hente, B. M. Kukreti, J. S. Schendel, and J. D. Tulk. Oct 84, 228p SAND-84-1737
Contract DE-AC04-76DP00789
Prepared in cooperation with Ontario Hydro, Toronto.

The seismic-fragility response of naturally-aged, nuclear station, safety-related batteries is of interest for two reasons: (1) to determine actual failure modes and thresholds and (2) to determine the validity of using the electrical capacity of individual cells as an indicator of the 'end-of-life' of a battery, given a seismic event. This report covers the first test series of an extensive program using 12-year old, lead-calcium, Gould NCX-2250 cells, from the James A. Fitzpatric Nuclear Power Station operated by the New York Power Authority.

514,029
NUREG-0748-V4-N11/GAR PC **A14**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
Operating Reactors Licensing Actions Summary, November 1984.
Dec 84, 306p
See also NUREG-0748-V4-N10.

The Summary is designed to provide the Management of the Nuclear Regulatory Commission (NRC) with an overview of licensing actions dealing with the operating power and nonpower reactors.

514,030
NUREG-1044/GAR PC **A07**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Evaluation of the Need for a Rapid Depressurization Capability for Combustion Engineering Plants.
Technical rept.,
L. Marsh, and C. Liang. Dec 84, 146p

This report documents the NRC staff evaluation of the need for providing a rapid primary system depressurization capability, in particular by using a power-operated relief valve(s) (PORVs), in the current 3410-MWt and 3800-MWt classes of plants designed by Combustion Engineering (CE). The staff reviewed the responses of licensees, applicants, and vendors to staff questions, supplemented by independent analyses by the staff and its contractors. The staff review led to the conclusion that, on the basis of risk reduction and cost/benefit considerations, no overwhelming benefit would result from requiring the installation of PORVs in CE plants that currently do not have them. However, when other unquantifiable considerations regarding the potential benefits of a PORV are factored into the evaluation, it appears that more substantial benefits could be realized. Given the more comprehensive studies currently under way to resolve the generic unresolved safety issue, USI A-45, Decay Heat Removal Reliability, the staff concludes that the decision regarding PORVs for these CE plants should be deferred and incorporated into the technical resolution of USI A-45. Resolution of USI A-45 will also include the effects of residual risks due to fires, floods, earthquakes, and sabotage.

514,031
NUREG-1111/GAR PC **A22**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Technical Specifications - Palo Verde Nuclear Generating Station, Unit No. 1, Docket No. 50-528, Appendix A to License No. NPF-34.
Dec 84, 516p

The Palo Verde, Unit 1 Technical Specifications were prepared by the U.S. Nuclear Regulatory Commission to set forth the limits, operating conditions, and other requirements applicable to a nuclear reactor facility as set forth in Section 50.36 of 10 CFR Part 50 for the protection of the health and safety of the public.

18J. Reactor Materials

514,032
PB85-144483 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Neutron Resonance Transmission Analysis of Reactor Fuel Samples.
Final rept.,
J. W. Behrens, R. G. Johnson, and R. A. Schrack. 1984, 7p
Pub. in Nuclear Technology 67, p162-168 Oct 84.

Neutron resonance transmission analysis (NRTA) was used to measure the isotopic content of fresh and spent nuclear reactor fuel samples. Using the National Bureau of Standards 100-MeV electron Linac as a pulsed neutron source, neutron transmission spectra were measured for two samples of fresh reactor fuel and two samples of spent fuel. The transmission spectra were fit using the well-known and unique neutron cross sections for each isotope of interest. For the fresh fuel samples, the (235)U and (238)U contents were determined and compared to the results of a destructive analysis. Excellent agreement was obtained. For the spent fuel samples, the abundances of 11 actinides and 5 fission products were obtained. NRTA was shown to be a method for nondestructive analysis with high isotopic discrimination and high accuracy.

514,033
PB85-145365 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Improved Mass Measurement Accuracy Using the PNB (Preloaded Narrow-Band) Load Cell Scale.
Final rept.,
S. Suda, P. Pontius, and R. Schoonover. 1981, 6p
Pub. in Nuclear Materials Management 10, p266-271, 15 Jul 81.

The PNB Load Cell Scale is a Preloaded, Narrow-Band calibration mass comparator. It consists of (1) a frame and servo-mechanism that maintains a preload tension on the load cell until the load an unknown mass is sensed, and (2) a null-balance digital instrument that suppresses the cell response associated with the preload thereby improving the precision, and accuracy of the measurements. Ideally, the objects used to set the preload should be replica mass standards that closely approximate the density and mass of the unknowns. The advantages of the PNB scale are an expanded

output signal over the range of interest which increases both the sensitivity and resolution, and minimization of the transient effects associated with loading and unloading of load cells. An area of immediate and practical application of this technique to nuclear material safeguards is the weighing of UF6 cylinders where in-house mass standards are currently available and where the mass values are typically assigned on the basis of comparison weighings. Several prototypical versions of the PNB scale have been assembled at the U.S. National Bureau of Standards. A description of the instrumentation, principles of measurements, and applications are presented in this paper.

18K. Reactor Physics

514,034
PB85-139277/GAR PC **E07**/MF **E07**
Centre d'Etude de l'Energie Nucleaire, Mol (Belgium).
Cassandre: A Two-Dimensional Multigroup Diffusion Code for Reactor Transients Analysis,
B. Arien, A. Siebertz, J. Devooght, and E. Mund. Sep 84, 122p BLG-571
Summaries in French and Dutch.

CASSANDRE is a two-dimensional (x-y or r-z) finite element neutronics code with thermohydraulics feedback for reactor dynamics prior to the disassembly phase. It uses the multigroup neutron diffusion theory. Its main characteristics are the use of a generalized quasistatic model, the use of a flexible multigroup point-kinetics algorithm allowing for spectral matching and the use of a finite element description. The code was conceived in order to be coupled with any thermohydraulics module, although thermohydraulics feedback is only considered in r-z geometry. In steady state criticality search is possible either by control rod insertion or by homogeneous poisoning of the coolant. This report describes in details the theoretical developments on which the code is based.

514,035
PB85-139731/GAR PC **E03**/MF **E03**
Science and Engineering Research Council, Chilton (England). Rutherford Appleton Lab.
Density Fluctuations in Simple Fluids,
S. W. Lovesey. c1984, 17p RAL-84-092

We clarify the relation between a simple viscoelastic theory of density fluctuations, and a recent proposal that describes the spectrum of fluctuations as the sum of three Lorentzian functions of the frequency. (Copyright (c) Science and Engineering Research Council 1984.)

19.
ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

514,036
AD-A148 685/1/GAR PC **A08**/MF **A01**
Assistant Secretary of Defense (Manpower, Installations and Logistics), Washington, DC.
Ammunition and Explosives Safety Standards.
31 Jul 84, 174p Rept no. DoD 6055.9-STD

These standards set forth minimum safety requirements for DoD ammunition and explosives, and to related facilities, equipment and operations.

514,037
N85-12159/8/GAR PC **A02**/MF **A01**
Materials Research Labs., Ascot Vale (Australia).
Influence of Inert Particulate Material on the Properties of RDX/Polyethylene Wax Compositions.
W. S. Wilson. May 84, 21p MRL-R-929, AR-003-911

Explosive formulations were prepared from RDX, an emulsifiable polyethylene wax and the inert solids graphite, haematite, and silicon carbide. The effects of these solids on the impact sensitivity, shock sensitivity, and velocity of the composition were investigated.

19C. Combat Vehicles

514,038
AD-A148 594/5/GAR PC **A03**/MF **A01**
Garrett Turbine Engine Co., Phoenix, AZ.
TACOM (Army Tank-Automotive Command) Phase III MICV/GT601/X-300.
Final test rept.,
A. G. Eckstat. 31 Jul 84, 31p 51-2732, TACOM-TR-12888
Contract DAAE07-82-C-4109

This report summarizes the results of TACOM Phase III Demonstration Testing conducted at the General Motors (GM) proving grounds at Milford, Michigan. Testing was conducted January 4 through 18, March 24 through 30, and completed June 7 through June 9, 1983, under the provisions of Contract DAAE07-82-C-4109. The purpose of this program was to demonstrate the characteristics of the Garrett GT601 gas turbine engine mated with a Detroit Diesel Allison (DDA) X-300 transmission, without a torque converter, installed in a mechanized infantry combat vehicle (MICV) loaded to 45,000 pounds gross vehicle weight (GVW).

514,039
AD-A148 712/3/GAR PC **A02**/MF **A01**
Standard Products Co., Port Clinton, OH.
T-156 Track with Removable Pad.
Final rept. 1 Sep 81-15 Dec 83,
A. B. Kendall. Sep 84, 13p 4701, TACOM-TR-13025

The T-156 track being used on the M1 vehicle is made with the roadwheel path rubber and ground pad rubber molded on an integral unit around a binocular style metal insert. The life of this track shoe is severely limited by the rate of wear and chunking to the ground pad side of the track shoe. This contract is an effort to develop modifications to the shoe body and to the ground pad to improve the track life by 20 percent.

514,040
AD-P004 261/4/GAR PC **A02**/MF **A01**
Royal Military Coll. of Science, Shrivenham (England).
Rolling Resistance and Sinkage of Towed Dual Wheel Combination in Sand,
J. G. Hetherington, and I. Littleton. Aug 84, 6p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p81-86.

The ability to predict the performance of wheeled vehicles across country is of paramount importance in both the design of military vehicles and assessing their effectiveness within a specified theatre of operation. In a previous paper by the authors a predictive formula was developed which effected the prediction of the rolling resistance and sinkage of towed wheels on sand. The advantage of the form of the equation was that, where other workers had employed the cone index gradient as a measure of sand strength for mobility studies, this prediction used only the soil bulk unit weight and the angle of friction of the soil. The predictive equation was shown to correlate well with experiments on a wide range of wheel geometries, loads and granular soils.

514,041
AD-P004 272/1/GAR PC **A02**/MF **A01**
Military Vehicles and Engineering Establishment, Chertsey (England).
Rig for Testing the Soft Soil Performance of Track Systems,
E. B. Maclaurin. Aug 84, 21p
This article is from 'Proceedings of the International Conference on the Performance of Off-Road Vehicles and Machines (8th). Volume 1. Held at Cambridge, England on August 5-11, 1984,' AD-A148 635, p291-311.

For a given level of performance the track and suspension system of a military tracked vehicle must be as light and compact as possible to maximize weight and volume available for crew and payload (armour protection, weapon and communication systems, ammunition, fuel, etc). Although track systems have been used on military vehicles for some seventy years method for predicting their performance in soft soil - and actual performance measurements - are limited and, even with its shortcomings, the nominal ground pressure term remains the performance comparator most commonly used by vehicle designers. This is partly because of the complexity of devising, proving and using improved methods and partly because military vehicle testing and training areas tend to be on sandy frictional soils where tracked vehicles rarely exhibit mobility problems.

19D. Explosions, Ballistics, and Armor

514,042
AD-A148 614/1/GAR PC **A03**/MF **A01**
Army Combat Systems Test Activity (Prov.), Aberdeen Proving Ground, MD.
International Weapon Blast Overpressure Experiment.
Final rept. Jun-Nov 84,
W. S. Walton. Nov 84, 43p Rept no. USACSTA-6109

Blast overpressure measurements were made at the Defence Research Establishment Valcartier (DREV), Quebec, Canada, 10 to 20 October 1984, at positions near: (a) 105-mm L5 howitzer firing charge 7; (b) 84-mm Carl Gustaf antitank weapon; (c) 110-gram bare spherical charge, 25.2% RDX, 58.8% PETN, 16% inert, (d) 410-gram bare spherical charge, 25.2% RDX, 58.8% PETN, 16% inert. This report describes the measurements made by US Army Combat Systems Test Activity (USACSTA). A complete report describing all measurements made by the five teams representing the United States, Canada, and the United Kingdom will be prepared by the Defence Research Establishment Valcartier. During this test, large gage-to-gage variations were noticed in the USACSTA transducers. These variations were present only in the first 200 microseconds of the measurements.

514,043
AD-A148 688/5/GAR PC **A02**/MF **A01**
Astron Research and Engineering, Mountain Valley, CA.
Evaluation of Internal Ballistic Capabilities of Wave Gun for Tactical Weapons Application.
Interim rept. no. 1,
T. J. Dahm. 1 Oct 84, 4p Rept no. 7042-01
Contract N00014-84-C-0742, ARPA Order-4942

No abstract available.

514,044
AD-A148 735/4/GAR PC **A05**/MF **A01**
Michigan Univ., Ann Arbor. Dept. of Aerospace Engineering.
Detonation Characteristics of Some Dusts and Liquid-Dust Suspensions.
Final rept. 1 May 79-1 May 83,
C. W. Kauffman, J. A. Nicholls, M. Sichel, P. Lee, and D. Lee. Jul 83, 84p UM-016968-F, AFOSR-TR-84-1130
Grant AFOSR-79-0093

The detonation characteristics of high explosive dusts dispersed in air were studied in a special 'shock tube type' facility wherein the dust was transported through the tube by a gas flow. Detonation of high pressure gases in the driver served to transmit a strong blast wave into the dust mixture. The resultant wave was monitored by pressure switches, pressure transducers, a photodiode, and streak photography. RDX dust in air could not be detonated. However, detonation was realized with 150-micrometre diameter particles in oxygen-enriched air. The small RDX particles (10 micrometre) could not be detonated, even with oxygen enrichment. The conclusion drawn was that the inertia of the large particles led to a large relative velocity between the particles and gas behind the shock wave with the attendant high stagnation temperature and rapid heating to ignition. Other experiments were con-

ducted wherein excess oxygen was supplied by the addition of ammonium perchlorate dust, AP, to the RDX. The AP did increase the sensitivity and some detonation results are presented. Experiments were conducted on the shock wave ignition characteristics of liquid fuel drops with entrained small dust particles. The liquid fuel used was decane and the dusts included RDX, AP and inert aluminum oxide. In general, these dusts served to decrease the ignition time delay and hence to increase the detonability. A theoretical model was developed for the ignition time delay of dust particles behind a shock wave and gave good agreement with experiment results. An approximate model for the combustion rate of dust predicted the propagation rate and structure of a steady state dust detonation.

514,045

N85-12353/7/GAR PC A02/MF A01
Materials Research Labs., Ascot Vale (Australia).
Penetrator/Armour Interactions: Background to Australian Work.
R. L. Woodward, and B. J. Baxter. Aug 84, 21p MRL-R-936, AR-003-920

Australian contributions to research in high rate deformation studies with particular reference to penetration mechanics and armor are reviewed. Computationally efficient models were developed which facilitate rapid and inexpensive predictions of penetration behavior. The scope and accuracy of various computational methods are discussed, together with some practical applications. A bibliography lists the major publications in subject areas of relevance.

19F. Guns

514,046

AD-A148 615/8/GAR PC A03/MF A01
Human Engineering Lab., Aberdeen Proving Ground, MD.
Analysis of the USAIS (US Army Infantry School) IMAAWS (Improved Medium Antiarmor Assault Weapon System) Portability Demonstration.
Final rept.,
S. T. Brainerd. Sep 84, 40p Rept no. HEL-TN-12-84

The US Army Infantry School conducted a demonstration of the portability of the Improved Medium Antiarmor Assault Weapon System (IMAAWS), using mockups weighing 11, 16, and 20 kg (25, 35, and 45 lbs). The demonstration revealed no significant differences among the different loads in their effects on marching time, heart rate, blood pressure, time to fire a rifle or marksmanship. This report provides details which show that the lack of significant differences was caused by the ideal and unrealistic conditions under which the demonstration was held. USAHEL's conclusion remains that the IMAAWS should add less than 14 kg (30 lbs) to the soldier's load.

514,047

AD-A148 703/2/GAR PC A02/MF A01
Foreign Technology Div., Wright-Patterson AFB, OH.
History of the Development of Aviation Machine-guns in the USSR,
C. Bincal. 6 Nov 84, 8p Rept no. FTD-ID(RS)T-1349-84
Edited trans. of Hongkong Zhishi (China) p24-25 Apr 84.

No abstract available.

19H. Underwater Ordnance

514,048

AD-A148 709/9/GAR PC A04/MF A01
Radian Corp., McLean, VA.
Estimating Sediment Mechanical Properties Relevant to Mine Burial Prediction from Acoustic Measurements: A Review of Available Regression Analyses,
J. W. Caruthers, R. R. Merker, and M. L. Schwendeman. Mar 82, 58p
Contract N00014-81-C-0375

The total system concept for the Buried-Mine Minehunting System (BURMMS) requires the ability to predict the probability that a mine will bury in a given environment. As an expeditious means of providing information upon which to make such a prediction, acoustic techniques hold significant potential. To obtain values for the parameters needed in the mine burial prediction models (density, grain size, and shear strength), quantitative relationships between them and acoustically measurable quantities are required. In search of the best quantitative relationship for general BURMMS application, this study explores the very large number of regression equations developed in the literature. Several of these equations are singled out for their potential for predicting values for density and grain size from measured values of sound velocity and reflection coefficient. The report addresses several problems that lead to questions regarding the quality of the prediction in some cases. It recommends a field-measurement and data-analysis program to reduce the uncertainty.

20. PHYSICS

20A. Acoustics

514,049

AD-A148 596/0/GAR PC A02/MF A01
Science Applications, Inc., McLean, VA.
SAI (Science Applications, Inc.) Interim Scattering Model/Ice (SISM/ICE).
Technical rept.,
R. R. Greene. Apr 84, 17p Rept no. SAI-84/1100
Contract N00014-84-C-0180

A reflection loss model for acoustic propagation under Arctic sea ice is described. It is applicable over the frequency range of 0 to 45 degrees. A sequence of scattering loss formulas based on perturbation techniques provides a smooth transition in frequency to an asymptotic loss level, based on a boss model, at the highest frequencies.

514,050

AD-A148 771/9/GAR PC A06/MF A01
Pennsylvania State Univ., State College. Applied Research Lab.
Acoustic Radiation from Single and Double Ribbed Circular Cylindrical Shells.
Technical memo.,
C. B. Burroughs, S. I. Hayek, J. E. Hallander, and D. A. Bostian. 30 Mar 84, 104p Rept no. ARL/PSU/TM-84-76
Contract N00024-79-C-6043

Measurements of the acoustic radiation from single and double ribbed circular cylindrical shells were made on the NUSC Transducer Calibration Platform (TCP) in Lake Seneca, NY. Six different types of mechanical drives were used at each of three locations inside the inner shell. Measurements of the shell vibration and acoustic radiation were made with and without outer shells installed around the inner shell structure. For two types of drives, measurements were made with a pressure release layer installed between the inner and outer shell surfaces. Acoustic radiation measurements were made as a function of frequency from 20 to 5,000 Hz and as a function of observation direction at several frequencies for each shell and drive measurement configuration. Measured acoustic radiation data as a function of frequency have been processed. Analysis of the processed data is presented and discussed. It is shown that the location of the drive had a significant effect on the acoustic radiation. The outer shell reduced the acoustic radiation at shell resonant frequencies, but had little effect on other frequencies. The pressure release layer in the double shell had little effect on the acoustic radiation.

514,051

DE85002016/GAR PC A02/MF A01
Los Alamos National Lab., NM.
Sound Velocity of Carbon at High Pressures.
J. W. Shaner, J. M. Brown, C. A. Swenson, and R. G. McQueen. 11 Sep 84, 4p LA-UR-84-2799, CONF-8409145-5
Contract W-7405-ENG-36
International colloquium on the physics and physicochemistry of highly condensed matter, Aussois, France, 11 Sep 1984.

We have measured the sound velocity in shock compressed graphite. The data are consistent with a model of solid diamond from 0.8 to 1.4 Mbar. 18 references. (ERA citation 10:002785)

514,052

N85-12652/2/GAR PC A03/MF A01
Bonn Univ. (Germany, F.R.).
S-Matrix and Acoustic Signal Structure in Simple and Compound Waveguides.
C. H. Wilcox. Mar 83, 38p PP-583

Acoustic signal propagation in both simple and compound waveguides is analyzed by means of normal model expansions. For simple waveguides the normal modes are constructed explicity by separation of variables. For compound waveguides they are constructed by a perturbation method based on those for simple waveguides. The asymptotic wave functions for a waveguide are characterized by a sequence of functions that, physically, describe the momentum distributions of the modal waves. With each waveguide is associated a scattering operator, or S-matrix, that operates in the space of these momentum distributions. The significance of the S-matrix in the analysis of acoustic signal structure in waveguides is demonstrated. The momentum distribution of the signal generated in a compound waveguide by sources far from the resonator is simply the image under the S-matrix of the momentum distribution of the signal generated by the same sources in the corresponding simple waveguide.

514,053

N85-12653/0/GAR PC A02/MF A01
National Research Council of Canada, Ottawa (Ontario).
Total Area of Diffusion Elements in a Reverberation Chamber and Measured Degree of Sound Absorption.
W. Kuhl, and H. Kuttruff. 1984, 14p NRC/CNR-TT-2110
Transl. into English from Acustica (West Germany), V. 54, No. 4, 1983 p 41-43.

The measurement of sound absorption of materials in reverberation rooms was examined. The absorption coefficient was measured using diffusers randomly suspended in the reverberation room.

514,054

N85-12654/8/GAR PC A04/MF A01
National Aeronautics and Space Administration, Washington, DC.
Shear-Layer Correction after Amiet under Consideration of Additional Temperature Gradient. Working Diagrams for Correction of Signals.
W. Dobrzynski. Jul 84, 57p NAS 1.15:77741, NASA-TM-77741
Contract NASW-3542
Transl. into English of the Mono. "Scherschichtkorrektur Nach Amiet Unter Berucksichtigung Einer Zusaetzlichen Temperaturscherschicht. Arbeitsdiagramme fuer die Korrektur Akustischer Signale Be Fernfeldmessungen in Windkanaelen MIT Offenen Messtrecken" Brunswick, Mar. 1984 p 1-60. Transl. by Scientific Translation Service, Santa Barbara, CA.

Amiet's correction scheme for sound wave transmission through shear-layers is extended to incorporate the additional effects of different temperatures in the flow-field in the surrounding medium at rest. Within a parameter-regime typical for acoustic measurements in wind tunnels amplitude- and angle-correction is calculated and plotted systematically to provide a data base for the test engineer.

514,055

PB85-141547 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Analog Time Domain Computation of Intensity for Band-Limited Noise in a Standing-Wave Tube.
Final rept.,
T. W. Bartel, and S. L. Yaniv. Nov 84, 4p
Pub. in Jnl. of Acoustical Society of America 76, n5 p1573-1576 Nov 84.

The analog computation of acoustic intensity to determine the sound power radiated from an open ended standing-wave tube (R.K. Cook and T.M. Proctor, J. Acoust. Soc. Soc. 65, 1542-1555 (1979)) was extended to sound waves composed of band-limited random noise. The bandwidth extension was achieved through the use of a two-channel wideband pi/2 phase shifting network. Comparison with the free-field method for determining sound power yielded agreement within 0.25 dB for bandwidths of 1/3-octave.

20B. Crystallography

514,056

AD-A148 756/0/GAR PC **A03**/MF **A01**
Army Materials and Mechanics Research Center, Watertown, MA.
Growth of Large Diameter Single Crystals by Vertical Solidification of the Melt.
Final rept.,
J. L. Caslavsky. Aug 84, 27p Rept no. AMMRC-TR-84-34

Growth of large diameter single crystals, especially of phases which melt at high temperatures and have a high specific gravity, is governed by conditions that quite differ from those which occur during the growth of crystals whose diameter does not exceed 50 mm. This paper defines and analyzes these special conditions and delineates their effect on crystal growth. It is also shown that in spite of the presence of negative factors which are inherent to the growth process of large diameter single crystals, these adverse factors, if recognized properly, can be brought under control to such a degree that the growth of large diameter single crystals can be achieved. The vertical solidification of melt method (VSOM) is described. This method produces large single crystals, even for binary mixtures with a steep liquidus. Neodymium-doped yttrium aluminum garnet (Nd:YAG) crystals have been grown 75 mm in diameter and 100 mm high. These crystals are also water clear. Both size and perfect crystallinity are important for application to lasers. (Author)

514,057

DE85000577/GAR PC **A03**/MF **A01**
Argonne National Lab., IL.
Computer Simulation of Grain-Boundary Properties in Ionic Crystals and Metals.
D. Wolf. 1984, 47p CONF-8407101-1
Contract W-31-109-ENG-38
NATO Advanced Research workshop on computer simulation of condensed matter, Norwich, UK, 22 Jul 1984.
Portions are illegible in microfiche products.

In recent years a set of computer codes has been developed at Argonne which permits one to determine the energies, structures, and point-defect properties of interfaces in metals and ionic crystals. To demonstrate some of the capabilities of these codes, in this article the calculated energies and structures of high-angle <100> twist grain boundaries in fcc metals and in metal oxides with NaCl structure are compared. The role of impurities and Schottky defects on the stability of such boundaries in the metal oxides is discussed in some detail. Particular emphasis is placed on the effect of the interatomic potential used in our calculations on the predicted physical properties of these grain boundaries. We conclude with a summary of those properties which depend on the potential chosen (i.e., on the particular material considered) and those phenomena which are independent of potential. (ERA citation 10:000882)

514,058

DE85000868/GAR PC **A02**/MF **A01**
Utah Univ., Salt Lake City.
Theoretical and Experimental Study of Solid Phase Miscibility Gaps in III/V Quarternary Alloys. Progress Report.
G. B. Stringfellow. 1 Oct 84, 5p DOE/ER/45061-T1
Contract FG02-84ER45061

This report summarizes progress on the OMVPE growth and characterization of GaAsSb. (ERA citation 10:002779)

514,059

DE85001073/GAR PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Structure of Dense Alkali Halide Melts.
M. Ross, and F. J. Rogers. Aug 84, 9p UCRL-91364, CONF-8409145-4
Contract W-7405-ENG-48
International colloquium on the physics and physicochemistry of highly condensed matter, Auossis, France, 11 Sep 1984.

Calculations of the ion-ion pair distribution functions in shock melted alkali halides show that the melt undergoes a gradual pressure induced structural change from an open NaCl-like structure to one that has a rare gas-like arrangement containing about twelve neighbors of mixed charge. 12 references. (ERA citation 10:002795)

514,060

DE85001185/GAR PC **A02**/MF **A01**
Ohio State Univ., Columbus. Dept. of Welding Engineering.
Ultrasonic Wave Propagation in Anisotropic Solids.
L. Adler. 5 Apr 83, 23p DOE/ER/10585-T1
Contract AS05-80ER10585
Portions are illegible in microfiche products.

Nickel is being used as experimental material. A report is made on columnar structures in anisotropic materials. Ultrasonic studies of bicrystal interface are also reported. (ERA citation 10:000885)

514,061

DE85001285/GAR PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Enhanced Diffusion from Interstitial Trapping During Solid-Phase-Epitaxial Growth of Silicon Alloys. Draft.
S. J. Pennycook, J. Narayan, and O. W. Holland. Aug 84, 15p CONF-8407102-1-Dr
Contract AC05-84OR21400
Joint international conference on vapor growth and epitaxy and American conference on crystal growth, Atlantic City, NJ, USA, 16 Jul 1984.

During the recrystallization by solid-phase-epitaxial (SPE) growth of supersaturated silicon alloys, a high concentration of interstitials is trapped. These are released by subsequent heating causing a transient (greatly enhanced) diffusion of the substitutional dopant by an interstitialcy mechanism. The enhancement may be as much as five orders of magnitude over tracer values, and shows an activation energy of only 1.8 +- 0.2 eV. Following the transient, the interstitials condense into loops, allowing an independent estimate to be made of their concentration. From these observations, we propose that during ion implantation, a fraction of the implanted dopants can acquire their natural valency, and retain it as the crystallization interface passes. For group V dopants this creates the trapped interstitials, giving transient enhanced diffusion when they are released by subsequent annealing. (ERA citation 10:002776)

514,062

DE85001811/GAR PC **A03**/MF **A01**
Washington Univ., St. Louis, MO. Dept. of Physics.
Microscopic Determinations of Lattice and Electronic Structures of Solids. Progress Report, 1980-1981.
P. C. Gibbons. 4 Mar 81, 38p DOE/ER/10440-T1
Contract AC02-79ER10440

This is a renewal proposal and a Progress Report on the beginning of the Demonstration Phase of this project, 1980 to 1981. The high-flux, imaging, electron energy-loss spectrometer is operating. Some data are being gathered for preliminary analyses of structures in aluminum, silicon, gallium arsenide, metal hydrides, and other materials. Operating time is now primarily used for screening samples for further study here and at a spectrometer at the University of Illinois at Urbana, and for tuning our spectrometer for better resolution. Data from both spectrometers are being used to start a number of fundamental, materials research programs involving the materials listed. (ERA citation 10:003606)

514,063

N85-12696/9/GAR PC **A99**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Projekttraegerschaft fuer Nukleare Festkoerperforschung und Nuklearchemie.
Bericht des Gutachterausschusses: Nukleare Festkoerperforschung, 1980-1982 (Report on Research Results in Solid State Nuclear Physics, 1980-1982).
Mar 84, 756p JUEL-SPEZ-250
Partly in German and English.

No abstract available.

514,064

N85-12766/0/GAR PC **A05**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England).
Transport Processes During the Growth of Oxide Films at Elevated Temperature.
A. Atkinson. Jun 84, 95p AERE-R-11293

The current understanding of the growth of thermal oxide films in terms of the transport properties of the oxides is reviewed. The two most useful theories of file growth are those of Wagner for thick films and Cabrera and Mott for thin films. Particular attention is given to examining the expected limits of validity of these theories and to the various ways in which their predictions can be tested experimentally. The growth of a selection of important oxides is then discussed in the light of these two theories. Except at very high temperatures, diffusion along oxide grain boundaries controls the rate of growth of the crystalline oxides. When this dominant contribution from grain boundary diffusion is taken into account, the Wagner theory describes the growth of most films thicker than approximately 10 nm reasonably well. The Cabrera and Mott theory is not so successful in describing the growth of thinner films.

514,065

N85-12767/8/GAR PC **A03**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England).
Physical Interpretation of the Structure and Electron-Optical Data for Spinel (MgAl2O4).
S. J. Shaibani. Jun 84, 50p AERE-R-11278

The spinel structure is presented in an easily understandable form. This description is also expressed in an abbreviated form. Theoretical electron diffraction patterns are evaluated and are found to agree with the experimental TEM results obtained. Extinction distances for all low-order reflections in spinel were calculated for differing degrees of ionicity.

514,066

PB85-140986 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Lessons from the I.U.Cr. (International Union of Crystallography) X-ray Attenuation Project.
Final rept.,
D. C. Creagh, and J. H. Hubbell. Aug 84, 1p
Grant NSF-EAR82-06256
Sponsored by Department of Energy, Washington, DC.
Pub. in Acta Crystallographica, Section A: Crystal Physics, Diffraction, Theoretical and General Crystallography 40 (Supplement), p C-175 1984.

The I.U.Cr. X ray Attenuation Project, which was inaugurated in 1978 under the auspices of the Commission for Crystallographic Apparatus, is now almost finished. Some laboratories have yet to report their results and we are still receiving inquiries by laboratories wishing to join the project. It is our intention to provide specimen materials to these laboratories and to produce, at a later stage, addenda to the project reports which are now in the final stages of preparation.

514,067

PB85-145175 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Second Generation Automated Powder Diffractometer Control System.
Final rept.,
R. L. Snyder, C. R. Hubbard, and N. C. Panagiotopoulos. 1982, 16p
Pub. in Advances in X-Ray Analysis 25, p245-260 1982.

The real-time x-ray powder diffractometer control system AUTO incorporates several advances in data collection and analysis. Counting procedures for selected data collection are optimized to achieve either a preselected statistical error in minimum time or a minimum error in fixed total time. Run files are employed to greatly simplify quantitative analysis procedures and for controlling repetitive runs. External calibration curves for 2 theta are used to eliminate all but sample dependent aberrations to peak positions. A generalized data file structure is used to document the instrumental variables and sample parameters.

514,068
PB85-145332 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Atomic Structure of (001)W.
Final rept.,
R. T. Tung, W. R. Graham, and A. J. Melmed. 1982, 23p
Pub. in Surface Science 115, n3 p576-598 1982.

Results of a field-ion microscope study of the clean surface structure of the (001) surface plane of tungsten are presented. The major conclusions are that (001) W is reconstructed over the temperature range 15-580K, and that the reconstructed surface contains an alternating vertical component to the displacements of the W surface. Details of this newly developed experimental approach for the study of surface reconstruction are reported, along with a number of control experiments which exclude the possibility that these results are artifacts due to the experimental technique. The discussion includes a comparison of the present results with those drawn from other experimental techniques, primarily low energy electron diffraction.

514,069
PB85-145530 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Neutron Diffraction Structure Determination of the High-Temperature Form of Lithium Tritantalate, H-LiTa3O8.
Final rept.,
J. L. Hodeau, M. Marezio, A. Santoro, and R. S. Roth. 1984, 18p
Pub. in Jnl. Solid State Chemistry 51, p275-292 1984.

The crystal structure of H-LiTa3O8 has been reexamined by electron and neutron diffraction techniques. Neutron Weissenberg and electron diffraction photographs show that the space group of the compound is Pmmn and not Pmma as determined previously by X-ray diffraction techniques. There are eight molecules in the unit cell of lattice parameters a = 16.718(2) A, b = 7.596(1) A, c = 8.931(1) A. These values show that the b axis of the new cell is doubled with respect to the parameter measured by X-rays. The structural refinement was based on 1074 independent reflections measured on a single crystal with a four-circle neutron diffractometer. The large thermal vibrations found for the lithium atoms and the ionic conductivity of H-LiTa3O8 at high temperatures are consistent with weak Li-O bonding.

20C. Electricity and Magnetism

514,070
PB85-139558/GAR PC **E04**/MF **E04**
Science and Engineering Research Council, Chilton (England). Rutherford Appleton Lab.
Examples in the Use of the Finite Element Library: Non-Linear Magnetostatic Solution,
C. Emson, and C. Greenough. c1984, 35p RAL-84-105

Until recently finite element techniques were almost exclusively used in structural engineering problems. But now there is a growing awareness that they have great potential in many other fields outside structural analysis. The Finite Element Library is an attempt to make the techniques available to a much larger population. The flexibility needed to accomplish this can only really be provided in the context of a software library. Over the past few years the library has been greatly extended and generalized by staff at the Rutherford Appleton Laboratory and it now forms the software base for many research programs throughout United Kingdom Universities and Polytechnics. The Library is in two Levels. One cosists of subroutines which perform most of the basic steps required in a finite element analysis, the other of example programs in various application areas. These programs provide a guide to the programming philosophy and give a basic program which the user can amend to meet his own particular requirements. This report describes one of the example programs contained in the Level 1 Library.

514,071
PB85-145209 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Emission Characteristics of Electrically Small Radiating Sources from Tests Inside a TEM Cell.
Final rept.,
I. Sreenivasiah, D. C. Chang, and M. T. Ma. 1981, 9p
Pub. in IEEE (Institute of Electrical and Electronics Engineers) Transactions on Electromagnetic Compatibility 23, n3 pt1 p113-121 Aug 81.

An electrically small radiating source of arbitrary nature may be modeled by an equivalent dipole system consisting of three orthogonal electric dipoles and three orthogonal magnetic dipoles, each excited with arbitrary amplitude and phase. A method of determining the individual dipole moments and the cross-components of such a dipole system, by tests inside a TEM cell, is presented along with some experimental results.

514,072
PB85-148005 Not available NTIS
National Bureau of Standards (NEL), Boulder, CO. Electromagnetic Fields Div.
Theoretical and Experimental Investigations of Loading Effects Due to a Perfectly Conducting Rectangular Cylinder in a Transverse Electromagnetic Cell.
Final rept.,
M. Kanda. 1981, 6p
Pub. in Proceedings of Symposium and Technical Exhibition on Electromagnetic Compatibility (4th), Zurich, Switzerland, March 10-12, 1981, p401-406.

The study of electromagnetic compatibility (EMC), that is the electric and biological system effects due to electromagnetic (EM) radiation and EM calibration, require accurate EM measurement techniques for defining the EM interference (EMI) characteristics. Thus, fully enclosed rectangular transverse electromagnetic (TEM) transmission lines with thin inner conductors are often used for generating standard known test fields. In all cases it is desirable that only the dominant TEM mode should propagate. The purpose of this paper is to discuss the loading effects, i.e., the electromagnetic field distortion caused by an object under test in a TEM cell. In the theoretical analysis, the frequency domain integral equation for the magnetic field, or equivalently, the current density on the surface of a perfectly conducting cylinder in a parallel plate waveguide is solved by the method of moments to predict the degree of magnetic field distortion.

20D. Fluid Mechanics

514,073
AD-A148 699/2/GAR PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Free Shear Layer Prediction of the Turbulent Wake of a Flat Plate Towed Below a Free Surface.
Memorandum rept.,
R. A. Skop. 18 Dec 84, 17p Rept no. NRL-MR-5476

The turbulence modeled, parabolic Navier-Stokes equations are used to predict the wake of a flat plate towed below a free surface. Prandtl's free shear layer approximation is employed to represent the turbulent kinematic viscosity. The agreement between the predicted and measured velocity profiles is found to be excellent.

514,074
AD-A148 761/0/GAR PC **A03**/MF **A01**
Army Ballistic Research Lab., Aberdeen Proving Ground, MD.
Van Leer Shock Capturing Algorithm for the Euler Equations.
Final rept.,
C. H. Cooke. Oct 84, 37p BRL-MR-3400, SBI-AD-F300 513

Van Leer's second-order accurate sequel to the first-order method of Goduno v, originally formulated in the framework of Lagrangean fluid dynamics, is revised so as to apply to numerical calculation of solutions to the one-dimensional Euler equations of compressible flow. Comparisons of performance between the first and second order method are shown for the linear shock tube problem. Use of artificial viscosity, as opposed to oscillation limiting, is discussed.

514,075
AD-A148 784/2/GAR PC **A03**/MF **A01**
Army Ballistic Research Lab., Aberdeen Proving Ground, MD.
Numerical Computation of Base Flow for a Missile in the Presence of a Centered Jet.
Final rept.,
J. Sahu, and C. J. Nietubicz. Oct 84, 41p BRL-MR-3397, SBI-AD-F300 510
Supersedes Rept. no. BRL-IMR-789 dated Sep 83.

A thin-layer Navier-Stokes base flow code, developed for projectile aerodynamics, has been used to compute the missile base flow in the presence of a centered propulsive jet. The thin-layer, compressible, Navier-Stokes equations are solved using a time dependent, implicit numerical algorithm. Numerical computations have been made to predict the missile afterbody flow field for both jet-off and jet-on conditions. Solutions are obtained for an axisymmetric cylindrical afterbody where the free stream Mach number is 1.343 and the jet exit Mach number is 2.7. The exhaust jet static pressure is 2.15 times the free stream static pressure. Computed results show both qualitative and quantitative features of the base region flow field.

514,076
AD-A148 832/9/GAR PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Classification and Nonlinear Solution of One Type of Stratified Shear Flow,
L. Shida, C. Jiayi, L. Shishi, and W. Shufang. 5 Nov 84, 22p Rept no. FTD-ID(RS)T-1151-84
Edited trans. of Lixue Xuebao (China) v16 n2 p121-131 Mar 84.

No abstract available.

514,077
DE85002209/GAR PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Front Tracking and Two Dimensional Riemann Problems: A Conference Report.
J. Glimm, C. Klingenberg, O. McBryan, B. Plohr, and D. Sharp. 1984, 22p LA-UR-84-3209, CONF-8405221-3
Contract W-7405-ENG-36
Army conference on applied mathematics and computing, Troy, NY, USA, 22 May 1984.
Portions are illegible in microfiche products.

A substantial improvement in resolution has been achieved for the computation of jump discontinuities in gas dynamics using the method of front tracking. The essential feature of this method is that a lower dimensional grid is fitted to and follows the discontinuous waves. At the intersection points of these discontinuities, two-dimensional Riemann problems occur. In this paper we study such two-dimensional Riemann problems from both numerical and theoretical points of view. Specifically included is a numerical solution for the Mach reflection, a general classification scheme for two-dimensional elementary waves, and a discussion of problems and conjectures in this area. (ERA citation 10:001383)

514,078
DE85002713/GAR PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Algorithm for the Simulation of Transient Viscoelastic Flows with Free Surfaces.
R. Keunings. Oct 84, 45p LBL-18469
Contract AC03-76SF00098

We propose a numerical procedure for solving a class of transient viscoelastic flows with free surfaces. It is based on a Galerkin/Finite Element technique on deforming elements combined with a predictor-corrector

scheme. The method is applied to the analysis of jet breakup caused by capillary forces. Non-linear effects known to experimentalists are predicted and a detailed comparison with asymptotic results is carried out. (ERA citation 10:003028)

514,079
N85-12036/8/GAR PC **A03**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Model Equation for Simulating Flows in Multistage Turbomachinery.
J. J. Adamczyk. Nov 84, 37p NAS 1.15:86869, E-2291, NASA-TM-86869

A steady, three-dimensional average-passage equation system is derived for use in simulating multistage turbomachinery flows. These equations describe a steady, viscous flow that is periodic from blade passage to blade passage. From this system of equations, various reduced forms can be derived for use in simulating the three-dimensional flow field within multistage machinery. It is suggested that a properly scaled form of the average-passage equation system would provide an improved mathematical model for simulating the flow in multistage machines at design and, in particular, at off-design conditions.

514,080
N85-12314/9/GAR PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Vortex-Generating Coolant-Flow-Passage Design for Increased Film-Cooling Effectiveness and Surface Coverage.
S. S. Papell. Nov 84, 24p NAS 1.60:2388, E-2147, NASA-TP-2388

The thermal film-cooling footprints observed by infrared imagery for three coolant-passage configurations embedded in adiabatic-test plates are discussed. The configurations included a standard round-hole cross section and two orientations of a vortex-generating flow passage. Both orientations showed up to factors of four increases in both film-cooling effectiveness and surface coverage over that obtained with the round coolant passage. The crossflow data covered a range of tunnel velocities from 15.5 to 45 m/sec with blowing rates from 0.20 to 2.05. A photographic streakline flow visualization technique supported the concept of the counterrotating apability of the flow passage design and gave visual credence to its role in inhibiting flow separation.

514,081
N85-12317/2/GAR PC **A03**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Structure of the Vorticity Field in Turbulent Channel Flow. Part 2: Study of Ensemble-Averaged Fields.
J. Kim, and P. Moin. Oct 84, 41p NAS 1.15:86657, REPT-85014, NASA-TM-86657

Several conditional sampling techniques are applied to a data base generated by large-eddy simulation of turbulent channel flow. It is shown that the bursting process is associated with well-organized horseshoe vortices inclined at about 45 deg. to the wall. These vortical structures are identified by examining the vortex lines of three-dimensional, ensemble averaged vorticity fields. Two distinct horseshoe-shaped vortices corresponding to the sweep and ejection events are detected. These vortices are associated with high Reynolds shear stress and hence make a significant contribution to turbulent energy production. The dependency of the ensemble averaged vortical structures on the detection criteria, and the question of whether this ensemble-averaged structure is an artifact of the ensemble averaging process are examined. The ensemble-averaged pattern of these vortical structures that emerge from the analysis could provide the basis for a hypothetical model of the organized structures of wall-bounded shear flows.

514,082
N85-12326/3/GAR PC **A12**/MF **A01**
Oxford Univ. (England).
Study of the Effect of Wake-Passing on Turbine Blades.
D. J. Doorly. 1984, 275p OUEL-1515/84
Contracts RR-2D2-83D, SRC-GRB-17754

A wake generator which allows detailed unsteady heat transfer rate measurements to be made of the effects of wake-passing on a turbine blade was developed. Fluctuating pressure measurements and Schlieren photography were used to record the motion of a chopped wake through the blade passage. The unsteady transition of the blade boundary layer in response to wake-passing was established. Unsteady separation induced by shock cutting is revealed. The complete time history of the boundary layer response to external disturbances was mapped. Fast Fourier Transformation analysis was applied to trace the development of turbulent boundary layer features. Results show that wake-passing can produce significant effects on the mean and fluctuating heat transfer rate to turbine blades.

514,083
N85-12327/1/GAR PC **A03**/MF **A01**
Technische Hochschule, Darmstadt (Germany, F.R.).
Wall Effects on the Slow Steady Motion of a Particle in a Viscous Incompressible Fluid.
T. M. Fischer. Jun 84, 28p PREPRINT-828
Submitted for Publication.

Asymptotic expansions with respect to small Reynolds numbers are proved for the slow steady motion of an arbitrary particle in a viscous, incompressible fluid past a single plane wall. The flow problem is modelled by a boundary value problem for the stationary, nonlinear Navier-Stokes equations. The coefficients of these expansions are the solutions of linear Stokes problems which can be constructed by single layer potentials and corresponding boundary integral equations on the boundary surface of the particle. Asymptotic estimates at small Reynolds numbers for the slow steady motion of an arbitrary particle in a viscous, incompressible fluid between two parallel, plane walls and in a infinitely long, rectilinear cylinder of arbitrary cross section are presented.

514,084
PB85-137404/GAR PC **E04**/MF **E04**
Institut Franco-Allemand de Recherches, Saint-Louis (France).
Experimentelle und Theoretische Untersuchung der Partikelbewegung in Einem Kompressiblen Wirbel (Experimental and Theoretical Study of Particle Movement in a Compressible Vortex).
W. Jaeger, and A. George. 21 Oct 83, 53p R-129/83
Text in German, summaries in German and French.

The optical Doppler effect is used increasingly when determining flow velocities. Particles are added to the flow for light scattering. For small scatter particles particle speed is practically equal to flow velocity. Method fails when time or space changes in flow field are too high. Direct goal of studies is demonstration of laser anemometry boundaries. Executed within framework of a General Dynamics study of dust-charged gases. Also: What do strike lines say about a flow if particles cannot follow it, with what uncertainty can turbulent flows, esp. flows in boundary- and mixed layers, be visualized with dust carried along. For this, particle-carrying was studied at first in a compressible, approximately two dimensional vortex behind an edge in a shock-wave tube. The density field was visualized with interferometry. Flow speeds were measured at a fixed place as a function of time, particle size and density with a Doppler velocimeter. A Michelson interferometer with different arm lengths visualized the velocity field by interference strip shifts, furnishing together with velocity distribution at a fixed time the particle distribution in the vortex. Data measured were compared with numerical simulation calculations, using simple relations from the literature to determine velocities and densities in vortex. Particle movement was found in first approximation with Stokes' resistance law, leading to satisfactory agreement with experiment.

514,085
PB85-139657/GAR PC **E04**/MF **E04**
National Engineering Lab., East Kilbride (Scotland).
Efficiency of an Etoile Flow Straightener in Non-Symmetric Swirling Flow Upstream of Orifice Plates.
A. McHugh, F. C. Kinghorn, and W. D. Dyet. c1984, 27p NEL-692

The effectiveness of an etoile straightener, in removing nonsymmetric swirl produced by a double bend from the flow upstream of orifice plates of various area ratios was measured. The straightener removed the swirl but left the flow with an asymmetric velocity profile. (Copyright (c) Crown Copyright 1984.)

514,086
PB85-142065 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Pressure Tensor and Viscosity Coefficients of a Soft Sphere Liquid under Shear.
Final rept.,
S. Hess, and H. J. M. Hanley. 1983, 8p
Pub. in International Jnl. of Thermophysics 4, n2 p97-114 1983.

General properties and consequences of the distortion of the structure of a simple liquid subjected to a planar shear flow are reported. In particular, the orientational distribution of particles in the first coordination shell around a given particle is analyzed and the effect of this distribution on the pressure tensor is discussed. The distorted distribution gives rise to a set of non-Newtonian viscosity coefficients reflecting the occurrence of normal pressure differences in the liquid. Numerical values of these viscosities are given for a soft sphere fluid at 7/8 of the freezing density using the technique of nonequilibrium molecular dynamics. A wide range of shear rates is considered and all viscosity coefficients are found to be functions of the shear rate.

514,087
PB85-145456 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Asymptotic Behavior of Three Particle Correlations.
Final rept.,
H. J. Raveche, and R. F. Kayser. Feb 84, 3p
Pub. in Physical Review A: General Physics 29, n2 p1003-1005 Feb 84.

The three particle correlation function, (G sub 3) (r sub 12, r sub 13, r sub 23), for a fluid with a longrange pair potential is computed in two limits: (a) all (r sub ij) approaches infinity, and (b) one distance, say (r sub 12), fixed and (r sub 13), (r sub 23) approaches infinity. In both cases, the pair potential times the square of the isothermal compressibility appears.

20E. Masers and Lasers

514,088
DE85000862/GAR PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Enhancing the Performance of a High-Gain Free Electron Laser Operating at Millimeter Wavelengths.
W. A. Barletta, B. Anderson, W. M. Fawley, V. K. Neil, and T. J. Orzechowski. 25 Oct 84, 21p UCRL-91123, CONF-8409163-1
Contracts AC03-76SF00098, W-7405-ENG-48
Workshop on coherent and collective properties of relativistic E-beams and electromagnetic radiation, Villa Olmo, Como, Italy, 13 Sep 1984.

A high-gain, high extraction efficiency, free electron laser (FEL) amplifier operating at the Experimental Test Accelerator (ETA) at 34.6 GHz has demonstrated a small signal gain of 13.4 dB/m. With a 30 kW input signal, the amplifier has produced a saturated output of 80 MW and a 5% extraction efficiency. Comparison of these results with a linear model at small signal levels indicates that the amplifier can deliver saturated output starting from noise, if the brightness of the electron beam is sufficiently high. The brightness of the ETA is far below that possible with optimized choice of practical design characteristics such as peak voltage, cathode type, gun electrode geometry, and focusing field topology. In particular, the measured brightness of the ETA injector is limited by plasma effects from the present cold, plasma cathode. As part of a coordinated theoretical and experimental effort to improve injector performance, we are using the EBQ gun design code to explore the current limits of gridless, relativistic, Pierce columns with moderate current density (>50 A/cm exp 2) at the cathode. The chief component in our experimental effort is a readily modified electron gun that will allow us to test many candidate cathode materials, types, and electrode geometries at field stresses up to 1 MV/cm. 8 references, 5 figures. (ERA citation 10:003008)

514,089
DE85001002/GAR PC **A06**/MF **A01**

KMS Fusion, Inc., Ann Arbor, MI.
KMSF X-Ray Laser Experiments. Task No. 1. Final Report.
G. Charatis. 1984, 110p UCRL-15630-1
Contract W-7405-ENG-48

This report summarizes work done at KMS Fusion, Inc. in support of the x-ray laser experimental program at Lawrence Livermore National Laboratory. This report catalogues the laser-target experiments that were performed, and briefly describes the major conclusions. The bulk of the original data has been reviewed by LLNL technical staff; much of it has been transferred for analysis at LLNL. Consequently, this report does not include a detailed presentation of the data. (ERA citation 10:001035)

514,090
DE85002208/GAR PC **A02/MF A01**
Los Alamos National Lab., NM.
Progress Toward Free-Electron Lasers for Applications.
C. A. Brau. 1984, 13p LA-UR-84-3149, CONF-841117-14
Contract W-7405-ENG-36
Conference on the application of accelerators in research and industry, Denton, TX, USA, 12 Nov 1984.

Using an electron beam in a magnetic field as the gain medium, free-electron lasers offer a powerful new source of tunable, coherent radiation. Results are just becoming available from several new experiments, but they are confirming the theoretical promise of these devices. Backed up by a strong base of accelerator technology, free-electron lasers are expected to become important in applications requiring wavelengths from the far infrared part of the spectrum to the vacuum ultraviolet. (ERA citation 10:003003)

514,091
PB85-140994 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Heterodyne Frequency Measurements and Frequency Calibration Standards for Tunable Diode Lasers.
Final rept.,
J. S. Wells, and F. R. Petersen. 1983, 9p
Pub. in SPIE 438, p110-118 1983,

New frequency calibration tables are required to keep abreast of the resolution attainable by currently available tunable lasers. One key to the generation of table with requisite accuracy involves accurate heterodyne frequency measurements, another key consists of reliable fitting and analysis. Coordinated activity in NBS involves selection of suitable molecular calibration candidates, their frequency measurement and analysis, and dissemination of the results in the form of frequency calibration tables. Current status of these efforts is described.

514,092
PB85-141034 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Simple, High Power, Nanosecond Pulse Nd:YAG Laser.
Final rept.,
A. Charlon, and P. Ewart. Jun 84, 4p
Pub. in Optics Communication 50, n4 p241-244, 15 Jun 84.

A relatively simple, Q-switched and self-injected oscillator is described which employs a passive forming network to produce single, one nanosecond duration laser pulses with nanosecond jitter times. Peak powers of 50 MW were obtained from the Nd:YAG system with 5% amplitude stability at 10 Hz repetition rates.

514,093
PB85-143667 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Water-Cooled 2 kW Calorimeter for Laser Power Measurement.
Final rept.,
P. A. Simpson, and R. W. Zimmerer. 1981, 3p
Pub. in Proceedings of the Technical Program - Electro-Optics/Laser 81, Conference and Exposition, Anaheim, CA., November 17-19, 1981, p237-239.

To meet the growing need for reliable monitoring of industrial high power CO2 lasers, a calorimeter was designed to be both easily used, reliable, and accurate. A maximum continuous power input of 2 kilowatts was specified in order to handle commonly used CO2 lasers. Two different measurement methods are discussed. First results indicate a sensitivity of 7.8 W/mV. The 1/e response time is approximately 6 seconds.

514,094
PB85-854354/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Semiconductor Laser Devices. 1970-January 1985 (Citations from the U. S. Patent Data Base).
Rept. for 1970-Jan 85.
Jan 85, 56p

This bibliography contains citations of selected patents concerning design, manufacturing, and application methods of semiconductor laser devices. Devices for emitting, modulating, confining, deflecting, and projecting laser beams are discussed. Methods of increasing heat dissipation efficiency, and preventing laser degradations due to excessive current flow are disclosed. (Contains 68 citations fully indexed and including a title list.)

20F. Optics

514,095
N85-12696/0/GAR PC **A03/MF A01**
Physikalisch-Technische Bundesanstalt, Brunswick (Germany, F.R.). Abt. Optik.
Einfluss Geometrischer Bedingungen Auf die Reflexionsindikatrix des Vollkommen Mattweissen Koerpers (Influence of Geometric Conditions on the Indicatrix of Reflection of the Perfect Reflecting Diffuser).
W. Erb, and M. Krystek. Jun 84, 28p PTB-OPT-16
In German; English Summary.

The angular distribution of the radiation reflected by the perfect reflecting diffuser (PRD) was calculated for geometric conditions of gonioreflectometers. Different distributions are found depending on whether the irradiated area of the PRD is totally or partially measured. In the first case the indicatrix of reflection is a sphere.

514,096
PB85-140655 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Minimization of Volume and Astigmatism in White Cells for Use with Circular Sources and Apertures.
Final rept.,
W. B. Olson. May 84, 6p
Pub. in Applied Optics 23, n10 p1580-1585, 15 May 84.

Conditions are derived for minimum volume and astigmatism of White-type multiple reflection absorption cells, with multiple row and column image arrays, for the case of circular images and apertures.

514,097
PB85-141582 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Standardizing Test Conditions for Characterizing Fibers.
Final rept.,
D. L. Franzen, G. W. Day, and R. L. Gallawa. Aug 81, 3p
Pub. in Laser Focus, p103-105 Aug 81.

Standard launching conditions for the measurement of optical fiber attenuation, bandwidth, and numerical aperture are described. Usefulness of the launching conditions is demonstrated in an interlaboratory measurement comparison.

514,098
PB85-142180 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Linewidth Measurement by High-Pass Filtering - A New Look.
Final rept.,
M. Young. 1 Jul 83, 4p
Pub. in Applied Optics 22, n13 p2022-2025, 1 Jul 83.

Earlier workers have noticed that high-pass filtering produces a sharp dark line in precisely the location of the geometrical image of an edge. They proposed using this fact as an aid in measuring linewidth in microscopy but found that the other edge of the line caused significant error. In this paper, the author examines that error as a function of normalized linewidth and normalized spatial-filter width and finds that it may be limited to + or - 5% or so, provided that the spatial filter subtends between 0.25 and 0.3X the numerical aperture of the objective and that the linewidth exceeds about twice the resolution limit.

514,099
PB85-144392 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Single Axis Photoelectronic Autocollimator.
Final rept.,
G. G. Luther, R. D. Deslattes, and W. R. Towler. May 84, 4p
Prepared in cooperation with Virginia Univ., Charlottesville. Dept. of Nuclear Engineering and Engineering Physics.
Pub. in Review of Scientific Instruments 55, n5 p747-750 May 84.

Several single axis, diffraction limited, monolithic autocollimators, capable of resolving less than 0.001 arc s have been designed and built. Their features include small size, lightweight, ruggedness, and ease of operation. Construction features and performance levels are given.

514,100
PB85-144467 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Refractive Properties of Magnesium Fluoride.
Final rept.,
M. J. Dodge. 15 Jun 84, 6p
Pub. in Applied Optics 23, n12 p1980-1985, 15 Jun 84.

The refractive indexes of a commercially available specimen of single crystal MgF2 were determined for both the ordinary and extraordinary rays at selected wavelengths from 0.2026 to 7.04 micrometers. Measurements were made by means of the minimum-deviation method on a precision spectrometer near 19C. The experimentally determined index values for each polarization were fitted to a three-term Sellmeier-type dispersion equation. The birefringence was computed as a function of wavelength from the calculated index values obtained for the two polarizations. The dispersion coefficients were also determined for the O-ray and for the birefringence. The results of this study are compared with previously reported work on the refractive properties of MgF2.

514,101
PB85-144921 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Intercomparison between Silicon and Blackbody Based Radiometry Using a Silicon Photodiode/Filter Radiometer.
Final rept.,
A. R. Schaefer, and R. D. Saunders. 15 Jun 84, 3p
Sponsored by National Research Council of Canada, Ottawa (Ontario).
Pub. in Applied Optics 23, n14 p2224-2226, 15 Jul 84.

A radiometer composed of a silicon photodiode, interference filter, and integrating sphere was characterized and calibrated against an absolute silicon detector standard at 600 nm using a CW dye laser. This radiometer was then used to measure the irradiance at 600 nm from spectral irradiance lamps calibrated against a gold point blackbody, and also the irradiance from the NBS electron storage ring, SURF II. These results were intercompared with those independently derived from the other two sources, with overall agreement of better than one percent. Various aspects of the measurements are discussed.

514,102
PB85-145472 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Two-Photon Absorption from a Phase Diffusing Laser Field.
Final rept.,
D. S. Elliott, M. W. Hamilton, K. Arnett, and S. J. Smith. Jul 84, 3p
Pub. in Physical Review Letters 53, n5 p439-441 Jul 84.

The authors report on the first quantitative measurements of the effect of a phase diffusing laser field on a nonlinear optical interaction. Using a nearly Lorentzian laser power spectrum, they have measured the spectral line width of an unsaturated two-photon absorption process. They found that the measured width scales as four times the laser width, in agreement with the theoretical predictions of Mollow.

514,103

PB85-148518 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Computer-Controlled System for Calibrating Detectors of TEA Laser Pulses.
Final rept.,
P. A. Simpson. May 84, 11p
Pub. in Proceedings of Automatic RF Techniques Group (ARFTG) Fall 1983 Digest (22nd), Albuquerque, NM., November 3-4, 1983, p25-36 May 84.

A computer-controlled system for calibrating detectors of TEA laser pulses is described. The types of detectors calibrated can be either energy detectors or waveform detectors. The operator inputs to the computer certain information pertinent to the measurements and the computer controls the run thereafter. Results are displayed on the screen, printed as hardcopy, and stored on cassette tape.

514,104

PB85-854230/GAR PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Range Finders. 1970-January 1985 (Citations from the U. S. Patent Data Base).
Rept. for 1970-Jan 85.
Jan 85, 79p

This bibliography contains citations of selected patents concerning the technology and applications of range finders. Among those discussed are laser, optical, electronic, and ultrasonic range finders. Automatic range finders for focusable photographic and cinematographic cameras are included. Range finders used in navigation, fire control, archery, and golfing are disclosed. (Contains 97 citations fully indexed and including a title list.)

20G. Particle Accelerators

514,105

AD-A148 626/5/GAR PC **A03/MF A01**
Naval Research Lab., Washington, DC.
Acceleration of an Electron Ring in a Modified Betatron with Transverse Pressure.
Memorandum rept.,
J. M. Grossman, J. M. Finn, and W. M. Manheimer. 6 Dec 84, 34p Rept no. NRL-MR-5444

An analytic and numerical scheme is developed to follow the adiabatic evolution of a beam with non-zero transverse pressure in a modified betatron. These calculations are made using improvements to previous zero pressure models in regimes where, as before, the poloidal inertia is ignored. The evolution of the beam is determined as a series of time independent equilibria with pressure appearing in our fluid approach as a gradient in the fluid equations of motion. The evolution of the pressure during adiabatic acceleration is determined by kinetic theory. The series of equilibria are then characterized by the constant number of particles within a drift (P sub theta) surface, the conserved toroidal flux inside a P sub theta surface, and the self-consistently evaluated pressure distribution (from magnetic moment conservation.) As in the case of zero pressure, it is found that the beam makes a transition from diamagnetic to paramagnetic orbits when it reaches a certain energy, and that the transition manifests itself by a change in the topology of the P sub theta surfaces during acceleration. As compared to our zero pressure results, it is found that the poloidal drift of the beam is significantly faster, so that measurement of this rotation frequency is a possible diagnostic for pressure. Despite the faster drift, however, the paramagnetic transition occurs at about the same energy in both cases. Finally it is observed that the higher poloidal drift frequency associated with this pressure forces the beam toward the Brillouin limit much sooner than in the cold beam case, and that contrary to simple estimates, the pressure increases rather than decreases during acceleration due to a coupling between toroidal and poloidal motion.

514,106

AD-A148 728/9/GAR PC **A03/MF A01**
Naval Research Lab., Washington, DC.
Plasma Assisted Modified Betatron.
Interim rept.,
W. M. Manheimer. 27 Dec 84, 28p Rept no. NRL-MR-5459

It is shown that the presence of a very tenuous background plasma can improve the performance of a modified betatron with respect to the problems of injection, diamagnetic to paramagnetic transition, and resistive wall instability. Several physics issues relating to this background plasma are discussed. Originator-supplied keywords include: High current accelerators.

514,107

DE84010542/GAR PC **A02/MF A01**
Brookhaven National Lab., Upton, NY.
Intense, Broadband, Pulsed I-R Source at the National Synchrotron Light Source.
G. P. Williams. 1984, 10p BNL-34491, CONF-841214-1
Contract AC02-76CH00016
IEEE conference on infra-red and submillimeter waves, Miami, FL, USA, 12 Dec 1984.
Portions are illegible in microfiche products.

We describe a broadband (1 mu m to 1 mm) synchrotron radiation infrared source, pulsed each 20 to 180 nseconds and delivering about 10 exp 15 photons/sec/1% bandpass into 110 optics. The source size is diffraction limited. This source is thus 100 to 1000 times brighter than a 2000 degrees K black body, very stable and capable of being used for calibration. (ERA citation 10:001087)

514,108

DE84702676/GAR PC **A02/MF A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods.
Choice of the Injection Scheme with a Fast-Varying Magnetic Field in an Adhezator of a Collective Accelerator.
V. M. Zhabitskij, and I. N. Ivanov. 1982, 11p JINR-R-9-82-592
In Russian.Submitted to the journal Sov. Phys. - Tech. Phys.
U.S. Sales Only.

The problem of the choice of the injection scheme with a fast-varying magnetic field in an adhezator of a collective accelerator is considered. It has been obtained that at the beam injection with the pulse duration of particle current r the magnitude of the distance between orbits injected at different time momenta of particles is proportional to the variation of the average alternating magnetic field anti g(rsub(0)) delta Jsub(tau); and the magnitude of amplitude gain of betatron oscillations is proportional to the variation of the alternating magnetic field g(rsub(0)) delta Jsub(tau) at r sub 0 radius of particle flight out of the injector snout. It is shown that the injection schemes, where for the distribution of the alternating nagnetic field over the radius in the median plane g(rsub(s)) > anti g(rsub(s))/2 at the equilibrium radius rsub(s), can be used at bunch injection with the pulse duration of particle current tau that is approximately equal to the time of revolution T of the electron in the magnetic field of the adhezator. The injection scheme with g(rsub(s)) < anti g(rsub(s))/2 provide the available electron density in the ring at the injection of long (in time) bunches (r >> T) and can be used as multi-turn injection systems. (Atomindex citation 15:041449)

514,109

DE84901558/GAR PC **A02/MF A01**
British Columbia Univ., Vancouver. TRIUMF Facility.
Monte Carlo Study of Contamination in the LESB1 Low Momentum Kaon Beam Line at Brookhaven.
J. Doornbos. May 84, 3p TRI-PP-84-32, CONF-8405193-45
Conference on the intersections between particle and nuclear physics, Steamboat Springs, CO, USA, 23 May 1984.
U.S. Sales Only.

The purpose of our investigation is to understand the contamination of kaon beams and suggest ways to minimize it. Here we have given some preliminary results of Monte Carlo calculations for LESB1 and LESB2. The total ratio (mu exp + + pi exp +)/K exp + = 3.9 at 750 MeV/c, in fair agreement with the measured ratio of 4.5. A few ball park calculations not reported here suggest that the pi exp + /K exp + ratio can be improved substantially if a better separation (10 mm instead of 6.5 mm) can be achieved at the mass slit. Furthermore, a collimator before B1 can reduce the pi contamination from K sub 0 decay by a factor 2. Other preliminary calculations suggest that scattering on a steel vacuum box gives only half as much contamination as for an aluminum (present) vacuum box. It is not unreasonable to expect that with various improvements we can obtain (mu exp + + pi exp +)/K exp + = 1.5. We also found a reasonable agreement with measurements for the pi contamination in a anti p beam at 750 MeV. (ERA citation 10:001086)

514,110

DE85000278/GAR PC **A02/MF A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
New Collider Scheme at LBL (Lawrence Berkeley Laboratory).
H. G. Pugh. Jul 84, 14p LBL-18165, CONF-8406189-5
Contract AC03-76SF00098
International conference on ultrarelativistic nucleus-nucleus collisions - QUARK MATTER '84, Helsinki, Finland, 17 Jun 1984.

This paper presents current ideas from Berkeley concerning a possible new facility for studying the phase transition from hadronic matter to quark matter. The physics ideas have evolved over a period of more than five years, the VENUS concept for a 25 GeV/nucleon colliding beam facility having been presented in 1979. The concept for the Minicollider has been, like that of VENUS, the work of Hermann Grunder and Christoph Leemann. (ERA citation 10:001079)

514,111

DE85000636/GAR PC **A02/MF A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Equilibration, Compression and Flow at the Bevalac.
H. G. Pugh. Jul 84, 20p LBL-18166, CONF-8406189-6
Contract AC03-76SF00098
International conference on ultrarelativistic nucleus-nucleus collisions - QUARK MATTER '84, Helsinki, Finland, 17 Jun 1984.
Portions are illegible in microfiche products.

This paper presents data acquired in the past two years by the Streamer Chamber group and the Plastic Ball group. The paper presents evidence that at Bevalac energies, head-on nuclear collisions result in stopping; it presents evidence for collective flow of the interacting nuclei; it presents evidence that a substantial part of the energy is tied up in compressional energy at the high density phase of the collision; finally, it presents recent data concerning aspects of the collisions such as interaction volume, particle ratios and temperatures. At the meeting at Bielefeld two years ago, it was not possible to make definitive statements about most of these subjects: the progress in the intervening period has been remarkable. 17 references, 14 figures, 1 table. (ERA citation 10:001094)

514,112

DE85000887/GAR PC **A02/MF A01**
Brookhaven National Lab., Upton, NY.
High Energy Facilities Advanced Projects: Intrabeam Scattering for a Beam of Gold Ions.
G. Parzen. 26 Jun 84, 18p BNL-35128
Contract AC02-76CH00016

This note presents the results for the effects of intrabeam scattering on the longitudinal and transverse beam dimensions for a beam of Au nuclei at various energies corresponding to gamma = 5 to gamma = 100, and for time periods of up to 10 hours. Intrabeam scattering is the scattering of the particles in the beam from each other through the Coulomb forces that act between each pair of particles. This causes the beam dimensions to grow both longitudinally and transversely, and results in requirements for the transverse aperture and the rf acceleration system. The beam growth also affects the collider performance, as the instantaneous luminosity will decrease with time. (ERA citation 10:003122)

514,113

DE85000890/GAR PC **A02/MF A01**
Brookhaven National Lab., Upton, NY.
AGS Fixed Target Program with Nuclear Beams.
K. J. Foley. 1984, 9p BNL-35240, CONF-8406189-8
Contract AC02-76CH00016
International conference on ultrarelativistic nucleus-nucleus collisions - QUARK MATTER '84, Helsinki, Finland, 17 Jun 1984.

Portions are illegible in microfiche products.

The recent approval of the beam transfer line from the Tandem Van de Graaf to the AGS signals the advent of a new era of Nuclear and Particle Physics at BNL. High Energy nuclear beams are expected to be available for experiments in 1986. I will discuss the direct link between the Tandems and the AGS. Two other proposed projects, the Relativistic Heavy Ion Collider and the Synchrotron Booster, are discussed in another presentation to this conference. (ERA citation 10:003115)

514,114
DE85001050/GAR PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Statistical Phenomena in Particle Beams.
J. J. Bisognano. Sep 84, 26p LBL-17714, CONF-8307141-1
Contract AC03-76SF00098
Summer school on high-energy particle accelerators, Batavia, IL, USA, 1 Jul 1983.
Portions are illegible in microfiche products.

Particle beams are subject to a variety of apparently distinct statistical phenomena such as intrabeam scattering, stochastic cooling, electron cooling, coherent instabilities, and radiofrequency noise diffusion. In fact, both the physics and mathematical description of these mechanisms are quite similar, with the notion of correlation as a powerful unifying principle. In this presentation we will attempt to provide both a physical and a mathematical basis for understanding the wide range of statistical phenomena that have been discussed. In the course of this study the tools of the trade will be introduced, e.g., the Vlasov and Fokker-Planck equations, noise theory, correlation functions, and beam transfer functions. Although a major concern will be to provide equations for analyzing machine design, the primary goal is to introduce a basic set of physical concepts having a very broad range of applicability. (ERA citation 10:003126)

514,115
DE85001229/GAR PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
RHIC And Quark Matter: A Proposed Heavy Ion Collider at Brookhaven National Laboratory.
T. W. Ludlam. 1984, 20p BNL-35237, CONF-8406189-7
Contract AC02-76CH00016
International conference on ultrarelativistic nucleus-nucleus collisions - QUARK MATTER '84, Helsinki, Finland, 17 Jun 1984.

For some time there had been strong interest at Brookhaven in exploiting the existence of the Colliding Beam Accelerator, CBA (nee ISABELLE), for the generation of heavy ion collisions at very high energies. Now the opportunity arose to consider the design of a dedicated heavy ion collider which could take advantage of the work already invested in the CBA project. In its report the Working Group recommended a top energy of at least 50 + 50 GeV/amu, emphasizing the need to cover a continuous range of energies extending as low 5 + 5 GeV/amu, with ion masses ranging from protons up to A > 200, and luminosity L > 10 exp 25 cm exp -2 sec exp -1 initially, ultimately reaching much higher values. These parameters were the subject of extensive scrutiny at the Quark Matter '83 Conference one month later at which several of the world's laboratories presented possibilities for very high energy nuclear beam facilities. After several days of such discussions a round table panel at the Conference strongly endorsed the recommendations of the August Working Group, with an emphasis on making the top energy as high as possible without sacrificing the capability for exploring the low energy range as well. (ERA citation 10:003114)

514,116
DE85001235/GAR PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
25 mu A Pulsed Polarized H exp - Ion Source.
J. Alessi, A. Kponou, and T. Sluyters. 1984, 6p BNL-35269, CONF-8409162-1
Contract AC02-76CH00016
International symposium on high energy spin physics, Marseille, France, 12 Sep 1984.

A Haeberli-type pulsed polarized negative hydrogen source has been brought into operation at the BNL Alternating Gradient Synchrotron. It operates reliably at beam currents sometimes as high as 25 mu A and 20 keV in beam pulses of 500 mu sec with approximately 75% polarization. These beam intensities are about an order of magnitude higher than the original Haeberli source built at the University of Wisconsin. This improvement is caused by the higher densities of both the atomic hydrogen beam and the cesium beam, which are the basic ingredients in the charge exchange reaction. About half the beam (10 to 15 mu A) is accelerated in the 200 MeV linac and injected into the AGS. 3 references, 3 figures. (ERA citation 10:003132)

514,117
DE85001828/GAR PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Simulation of Space Charge Effects in Particle Accelerators. Annual Report, August 1, 1983-September 30, 1984.
I. Haber. 1984, 13p DOE/DP/40092-6
Contract AI08-79DP40092
Portions are illegible in microfiche products.

Progress during the FY83/84 period has involved both the use of existing numerical tools to investigate current issues, and the development of new techniques for future simulations of increasing sophistication. A balance has been sought with a view towards maximizing the utility of simulations to both present and future decisions in accelerator design. Emphasis during this contract has centered on investigating the nonlinear dynamics of a very low emittance beam with a realistic distribution function - especially when complications such as the image forces from a nearby conducting electrode are considered. A significant part of the effort during this period was also expended in spreading the simulation capabilities already developed. Versions of the SHIFT (Simulation of Heavy Ion Fusion Transport) series of computer codes have been installed on machines available to the HIF community. The enhanced availability of these codes has facilitated their use outside of NRL. For example, simulation results with a significant impact on MBE design were obtained at LBL using the MFECC Version of SHIFT-XY. (ERA citation 10:003116)

514,118
DE85002037/GAR PC **A03**/MF **A01**
Los Alamos National Lab., NM.
Capabilities of the Los Alamos National Laboratory in Nuclear Target Technology.
J. C. Gursky. 1984, 26p LA-UR-84-2951, CONF-8409150-2
Contract W-7405-ENG-36
12. world conference of the International Nuclear Target Development Society, Antwerp, Belgium, 25 Sep 1984.
Portions are illegible in microfiche products.

Targets are made at Los Alamos for experiments at the Ion Beam Facility (Van de Graaff), the Medium Energy Physics Facility (LAMPF), and for experiments conducted at many other accelerators in the US and Europe. Thin, isotopic targets are made by sputtering and evaporation. Versatile, large-scale facilities exist for ceramics and plastics fabrication, electroplating, powder metallurgy, fabrication by pressing, casting and rolling, chemical and physical vapor deposition and sputtering. Special developments include ultra-precision machining, cryogenic targets and shaped-foil targets. 20 references. (ERA citation 10:003146)

514,119
DE85002063/GAR PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Crossed Undulator System for a Variable Polarization Synchrotron Radiation Source.
K. J. Kim. May 84, 16p LBL-18313, CONF-8405239-2
Contract AC03-76SF00098
Workshop on applicatons of circularly polarized synchrotron radiation, Albuquerque, NM, USA, 18 May 1984.
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A crossed undulator system can produce synchrotron radiation whose polarization is arbitrary and adjustable. The polarization can be linear and modulated between two mutually perpendicular directions, or it can be circular and can be modulated between right and left circular polarizations. The system works on low emittance electron storage rings and can cover a wide spectral range. Topics discussed include the basic principle of the system, the design equations and the limitations in performance. (ERA citation 10:003127)

514,120
DE85002205/GAR PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Survey of Radio-Frequency Quadrupole Accelerators.
J. H. Billen. 1984, 14p LA-UR-84-3191, CONF-8410172-1
Contract W-7405-ENG-36
Symposium of northeastern accelerator personnel, Stony Brook, NY, USA, 15 Oct 1984.

Over the last several years the RFQ has proved to be a very flexible low-energy accelerator for bunching and accelerating both low- and high-current beams. It uses low-voltage dc injectors, has excellent bunching properties and high transmission efficiency. Applications include injectors for higher energy machines, such as drift-tube linacs, cyclotrons, or synchrotrons. The RFQ can also be used alone for applications that require a fixed-energy beam. 41 references, 4 figures, 2 tables. (ERA citation 10:003125)

514,121
DE85002306/GAR PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Floating-Wire Measurements of the Magnet Used for Large-Angle Pion-Nucleus Scattering at EPICS.
W. B. Cottingame, G. R. Burleson, M. Brown, R. Kiziah, and D. Oakley. Aug 84, 11p LA-10201-MS
Contract W-7405-ENG-36

Floating-wire measurements carried out on the circular magnet used for a modification of the EPICS system for large-angle pion-nucleus scattering are described. The region of the incoming pion beam and that of the scattered pion were both covered. The effective radius of the magnet was determined to an uncertainty estimated to be +-1.5 mm. The resulting uncertainty in the scattering angle of the pion in experiments using this system is estimated to be +-0.22 exp 0 , with an upper limit of +-0.50 exp 0 . (ERA citation 10:003145)

514,122
DE85002310/GAR PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Experimental Investigation of Certain Beam Transport Issues in a Pulsed Transmission Line Linear Accelerator.
M. G. Mazarakis, R. B. Miller, S. L. Shope, L. E. Stevenson, and D. P. Coleman. Sep 84, 38p SAND-84-0095
Contract AC04-76DP00789
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The successful development of a new generation of high current, high voltage, linear induction accelerators relies on the solution of a number of beam transport problems, including radial oscillations, diocotron instabilities, transverse beam break-up (BBU), etc. Most of the instabilities appear to onset either at the injector region or at the accelerating gaps. Radial oscillations were first observed in RADLAC I, while transverse beam break-up was first observed on the SLAC accelerator, and more recently on the ETA accelerator. A low emittance, high current, high voltage injector precisely aligned with the guiding magnetic field axis and beam vacuum pipe axis is of prime importance for successful beam acceleration and transport. Similarly, an accelerating gap design which maintains radial force balance and an accelerating cavity with low Q and very small transverse shunt impedance Z/sub perpendicular/ should eliminate the most dangerous radial oscillations and beam break-up instabilities. The design and experimental studies of a new 4 MeV, 40 kA electron beam injector and accelerating gap will be presented. Test bench measurements of Z/sub perpendicular/ and Q on a typical radial transmission line accelerating cavity prove that BBU is not of concern unless the number of accelerating gaps become excessively large. (ERA citation 10:003129)

514,123
DE85002425/GAR PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Remote Operations and Viewing Using the Monitor System.
D. L. Grisham, J. E. Lambert, T. S. Baldwin, E. L. Ekberg, and T. R. Hernandez. 1984, 12p LA-UR-84-3458, CONF-841105-35
Contract W-7405-ENG-36
Joint meeting of the American Nuclear Society and the Atomic Industrial Forum, Washington, DC, USA, 11 Nov 1984.

Over the past two years, major rebuilding operations were conducted at the Clinton P. Anderson Meson Physics Facility (LAMPF). These operations involved replacement of complex experimental apparatus in high-radiation areas using servomanipulators and video viewing. All remote tasks were completed on or ahead of allotted schedules. This success is attributed to continuing improvement of manipulators, viewing systems, and operating techniques. (ERA citation 10:003147)

514,124
DE85002427/GAR PC A02/MF A01
Fermi National Accelerator Lab., Batavia, IL.
Derivation of Collins' Formulas for Beam-Shape Distortion Due to Sextupoles Using Hamiltonian Method.
K. Y. Ng. Oct 84, 13p FERMILAB/TM-1281
Contract AC02-76CH03000
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The introduction of sextupoles into a storage ring will distort the beam shape in both the horizontal and vertical phase space. The purpose of this note is to rederive the formulas for the lowest-order beam-shape distortion given by Collins using the Hamiltonian approach such as the one used by Ohnuma. Collins' formulas for the second-order tune-shift have been rederived by the Hamiltonian method in a recent note. We go over the Hamiltonian method briefly for two reasons: (1) to make this note more readable; and (2) to conform with the convention of Collins so that a comparison can be made. (ERA citation 10:003124)

20H. Particle Physics

514,125
DE84007346/GAR PC A02/MF A01
Sandia National Labs., Albuquerque, NM.
Theoretical Cross Sections for Inner-Shell Vacancy Production by High-Energy Electrons.
J. M. Peek. 1984, 7p SAND-84-0407C, CONF-841206-1
Contract AC04-76DP00789
Workshop on electronic and ionic collision cross sections needed in the modeling of radiation interations with matter, Argonne, IL, USA, 6 Dec 1984.

The creation of inner-shell vacancies can play an important role in the transport of and energy deposition by fast incident particles. Most high-energy electron-transport models include this phenomenology. A large body of cross-section data is available for this purpose, but many gaps remain to be filled by interpolation or extrapolation methods. The published data become more sparse as the energy of the incident particle becomes relativistic and the nuclear charge of the target becomes large. The use of relativistic Bethe-Born theory for inelastic electron scattering to augment the existing data for inner shell vacancy production is described. The data required to implement this technique have been calculated with both a Hartree-Fock and a relativistic Hartree-Fock description used to define the target structure. The resulting cross sections are available for most elements and for most of their orbitals if the valence electrons are excluded. Comparisons of these data with existing experimental and theoretical inner-shell ionization information are summarized. (ERA citation 10:001375)

514,126
DE84016543/GAR PC A13/MF A01
Florida State Univ., Tallahassee. Dept. of Physics.
Research in Elementary Particle Physics. Progress Report, August 1, 1979-July 31, 1984.
1984, 296p DOE/ER/03509-20
Contract AS05-76ER03509
Portions are illegible in microfiche products.

In this document the High Energy Physics Group reviews its accomplishments and progress over the past five years. Also, as requested by DOE, the proposal for continuing research covers the next five years. Of course, we have been much more specific for the next few years since factors beyond our control will have a strong influence in our choice of research during the latter part of the five-year period. (ERA citation 09:050759)

514,127
DE84016928/GAR PC A03/MF A01
Northern Illinois Univ., De Kalb. Dept. of Physics.
Proposal to Study the Weak Neutral Current at the Tevatron. Technical Progress Report.
F. E. Taylor. 23 Aug 84, 33p DOE/ER/05023-T1
Contract AC02-78ER05023
Portions are illegible in microfiche products.

The Flash Chamber - Proportional Tube Calorimeter has been used to study the weak neutral current in deep inelastic scattering at the 400 GeV FNAL Accelerator and it will be used at the Tevatron to extend the energy range of these measurements. The effort of this contract during the last year has been concentrated in three areas: (1) analysis of the 400 GeV Narrow Band Neutrino Beam Data taken in the experiment E-594 at Fermilab; (2) upgrade of the detector in preparation for the two experiments scheduled for the Tevatron; and (3) calibration of the detector up to Tevatron energies. (ERA citation 10:003670)

514,128
DE84017257/GAR PC A02/MF A01
Northern Illinois Univ., De Kalb.
Search for Horizontal Bosons at the SSC (Superconducting Super Collider).
C. H. Albright, N. G. Deshpande, J. F. Gunion, and H. E. Haber. 1984, 4p FNAL/C-84/77-T, CONF-8406198-5
Contract AC02-76CH03000
Design and utilization of the superconducting super collider summer study, Snowmass, CO, USA, 23 Jun 1984.
Portions are illegible in microfiche products.

The production process anti p p yields l exp - l' exp + + X, where the leptons belong to two different generations and X refers to spectator jets, provides a clear signature for horizontal (generation-changing) bosons when the leptons are emitted nearly back-to-back and p/sub T/ /sup miss/ = 0. Cross sections and p/sub T/ distributions for each lepton are presented, and discovery limits on M/sub H/ are extracted for several different channels. (ERA citation 10:003691)

514,129
DE84017258/GAR PC A02/MF A01
California Univ., Davis.
Searching for New W'S and Associated Neutrinos.
J. F. Gunion, and B. Kayser. Aug 84, 4p FNAL-84/81-T, CONF-8406198-1
Contracts AC02-76CH03000, AT03-76ER70191
Design and utilization of the superconducting super collider summer study, Snowmass, CO, USA, 23 Jun 1984.
Portions are illegible in microfiche products.

Several alternative scenarios for new W's and their associated neutrinos are explored with emphasis on the discovery of these particles at ep and pp colliders. (ERA citation 10:003708)

514,130
DE84017260/GAR PC A02/MF A01
Fermi National Accelerator Lab., Batavia, IL.
Separation of Quark and Gluon Jets in High-p/sub T/ Events.
T. Sjoestrand. 1984, 3p FNAL/C-84/83-T, CONF-8406198-6
Contract AC02-76CH03000
Design and utilization of the superconducting super collider summer study, Snowmass, CO, USA, 23 Jun 1984.
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We suggest a procedure, based on the kinematics of qg-scattering in high-p/sub T/ events, whereby it is possible to obtain enriched samples of quark and gluon jets. At SppS energies this could be used to indicate whether quark and gluon jet fragmentation agree or not. At higher energies the application would rather be to study the differences in the parton cascades, i.e. jet substructure. (ERA citation 10:003693)

514,131
DE84017261/GAR PC A02/MF A01
Fermi National Accelerator Lab., Batavia, IL.
Higgs Bosons at the SSC (Superconducting Super Collider): Supplement to EHLQ.
E. Eichten, I. Hinchliffe, K. Lane, and C. Quigg. 1984, 5p FNAL/C-84/76-T, CONF-8406198-4
Contracts AC03-76SF00098, AC02-76CH03000
Design and utilization of the superconducting super collider summer study, Snowmass, CO, USA, 23 Jun 1984.
Portions are illegible in microfiche products.

Cross section and background estimates are presented for the production of single charged and neutral Higgs bosons which decay into pairs of heavy quarks. In addition, pair production of Higgs scalars in q anti q collisions is estimated. (ERA citation 10:003690)

514,132
DE84702740/GAR PC A02/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Bethe-Salpeter Equation for Two-Quark System in the Fock Gauge.
V. N. Kapshay, N. B. Skachkov, and I. L. Solovtsov. 1983, 14p JINR-E-2-83-26
Submitted to the journal Theor. Math. Phys.
U.S. Sales Only.

The gauge condition of Fock (x - x sub 0)sup(mu)Asub(mu)(x)==0 is used to derive the Bethe-Salpeter equation for a gauge-invariant wave function of the two-particle system. The Green function of the vector field is found in the Fock gauge. (Atomindex citation 15:042352)

514,133
DE84702831/GAR PC A02/MF A01
International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee.
Measurements of the Total Neutron Cross-Sections of Poly- and Mono-Germanium Crystals at Neutron Energies Below 1 eV.
R. M. A. Maayouf, A. Abdel-Kawy, Y. Abbas, N. Habib, and M. Adib. Dec 83, 11p INDC(EGY)-004/L
The cross-section data obtained from this experiment are available under the accession number EXFOR-30668.
U.S. Sales Only.

Total neutron cross-section measurements have been performed for poly and mono-germanium crystals in the energy range from 2 meV-1eV. The measurements were performed using two TOF and a double axis crystal spectrometer installed at the ET-RR-1 reactor. The obtained neutron cross-sections were analyzed using the single level Breit-Wigner formula. The coherent scattering amplitude was determined from the Bragg reflections observed in the total neutron cross-section of Ge and the analysis of its neutron diffraction pattern. The incoherent and thermal diffuse scattering cross-sections of Ge were estimated from the analysis of the total cross-section data obtained for Ge mono-crystal. (Atomindex citation 15:043105)

514,134
DE84702880/GAR PC A02/MF A01
International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee.
Minutes of the Thirteenth INDC (International Nuclear Data Committee) Meeting, Rio de Janeiro, 16-20 May 1983.
J. L. Rowlands. Jan 84, 10p INDC-39/U, CONF-830586-Sum.
13. international nuclear data committee meeting, Rio de Janeiro, Brazil, 16 May 1983.
U.S. Sales Only.

The Thirteenth Meeting of the INDC was held in Rio de Janeiro from 16-20 May 1983. This was the first meeting of the Committee in its three year period 1983/85. The meeting was attended by 12 Committee members and one alternate member (members from the Federal Republic of Germany and the USA excused) plus four advisers and five observers from 13 Member States and two international organizations. The Committee reviewed the nuclear data activities of the IAEA, in Member States and of the nuclear data centre networks during the 1 year period since its Twelfth Meeting in Vienna in October 1981. It also gave detailed advice on the Agency's future nuclear data programme until 1985/86. The Committee congratulated the IAEA Nuclear Data Section (NDS) for its excellent work and for following closely the recommendations of INDC. The minutes include summaries of the meeting discussions, full reports of the Subcommittees, lists of

actions, participants and subcommittee membership. (Atomindex citation 15:043201)

514,135
DE84901559/GAR PC A02/MF A01
Alberta Univ., Edmonton. Dept. of Physics.
Test of Charge Symmetry in n-p Elastic Scattering at 480 MeV.
R. Abegg, J. Birchall, E. Cairns, H. Coombes, and C. A. Davis. May 84, 4p TRI-PP-84-31, CONF-8405193-42
Conference on the intersections between particle and nuclear physics, Steamboat Springs, CO, USA, 23 May 1984.
U.S. Sales Only.

An experiment to investigate the isospin-mixing charge-symmetry breaking component in the n-p interaction is under way at TRIUMF. The experiment measures the difference delta A between the neutron and proton analyzing powers A/sub n/ and A/sub p/ in n-p elastic scattering at 480 MeV. The experiment consists of two interleaved phases in which polarized (unpolarized) neutrons are scattered from an unpolarized (polarized) proton target of the frozen spin type. As a null measurement, requiring no accurately known polarization standards, the experiment determines the difference in angle at which A/sub n/ and A/sub p/ cross through zero. It intends to provide an unambiguous test of class IV charge-symmetry breaking effects to the level of delta A approx. = 0.001, corresponding to a laboratory angle difference at zero crossing of approx. 0.04 exp 0 . (ERA citation 09:048735)

514,136
DE85000002/GAR PC A02/MF A01
Tennessee Univ., Knoxville.
Bubble Chamber Studies of Hadron and Photon Interactions. Progress Report, April 1, 1984-September 30, 1984.
W. M. Bugg, J. E. Brau, G. T. Condo, T. Handler, and E. L. Hart. 1984, 13p DOE/ER/03956-3
Contract AS05-76ER03956

During the past year (1984), twelve papers have been published by the University of Tennessee elementary particle physics group. These included three papers involving low energy interactions of antiprotons with complex nuclei, five articles devoted to various aspects of photoproduction, and four articles dealing with high energy hadronic interactions utilizing bubble chamber film from CERN and Fermilab. Of equal importance, the group has narrowed the focus of its activities for the next few years to include two sequential neutrino experiments at FNAL and a major participation in the new detector facility (SLD) to be installed at the SLAC linear collider. We believe these experiments represent a timely commitment for the group and form the basis for a balanced program in the foreseeable future. (ERA citation 10:003669)

514,137
DE85000004/GAR PC A04/MF A01
Virginia Univ., Charlottesville.
Electron and Pion Interactions with Nuclei. Progress Report, August 1, 1983-August 1, 1984.
J. S. McCarthy. 1984, 51p DOE/ER/05661-5
Contract AS05-78ER05661
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The experimental program has been based upon the selective use of electron and pion probes to investigate fundamental aspects of nuclear structure. The experiments on electron accelerators span the region from low energy (<100 MeV) high resolution work to the region of electron energy where the fundamental description of the nucleus must be changed. The emphasis in the electron experiments is to understand the basic N-N force, in particular the short range behavior of this force and its effect on nuclear properties. The pion reactions have concentrated on the few body system in an attempt to understand the basic pion-nucleon dynamics. (ERA citation 10:001430)

514,138
DE85000011/GAR PC A03/MF A01
Florida Univ., Gainesville. Dept. of Physics.
Jets and Event Topologies at the SSC (Superconducting Super Collider).
R. D. Field. 23 Jun 84, 37p DOE/ER/40008-63, CONF-8406198-14
Contract AS05-81ER40008
Design and utilization of the superconducting super collider summer study, Snowmass, CO, USA, 23 Jun 1984.

Jets and event topologies in pp collisions at W = 40 TeV are studied using a QCD parton-shower Monte-Carlo model. The model includes gluon radiation both in the initial and final states and the hadrons are labeled according to whether they result from beam and target fragmentation or from outgoing parton fragmentation. Transverse energy grids are defined with emphasis, not on jet finding, but on the patterns of energy deposition. These patterns are quantified by examining the multiplicity of transverse energy clusters each of which have E/sub T/ greater than some fixed amount, E/sub T//sup each/. Large global transverse energy events are dominated by two large E/sub T/ clusters, but it is not uncommon to find, say, four clusters with E/sub T//sup each/ > 100 GeV. The large event-by-event fluctuations expected from QCD are investigated. 21 references. (ERA citation 10:003689)

514,139
DE85000013/GAR PC A04/MF A01
Louisiana State Univ., Baton Rouge.
Research in Elementary Particle Physics. Progress Report, March 1, 1984-February 29, 1985.
L. H. Chan, R. Haymaker, R. Imlay, and W. Metcalf. 1984, 72p DOE/ER/05490-60
Contract AS05-77ER05490

We describe theoretical work on an effective low energy theory of hadrons, dynamical symmetry breaking, anomalies, supersymmetry and the phenomenology of Higgs particles. The high energy experimental group at Louisiana State University has collaborated with Columbia, Stony Brook, and the Max Planck Institute on an experiment at the North Area of CESR. This experiment studied electron-positron annihilations in the region of the new upsilon family of particles with an apparatus optimized for detecting leptons and photons. The T'' has been observed with properties consistent with its being above threshold for B meson production and several decay modes have been studied in detail. The pi pi decays of the T' and T'' have also been measured as well as electromagnetic transition among the bb bound states. LSU contributed the muon detector for the experiment. We have concluded our participation in this experiment. The LSU group has joined a collaboration to measure neutrino oscillations at Los Alamos. We are now building the equipment for this experiment and should be taking data in 1985. We have also started to work on an e exp + e exp - experiment AMY which will run at TRISTAN in Japan. (ERA citation 10:003663)

514,140
DE85000084/GAR PC A02/MF A01
Argonne National Lab., IL.
Some Aspects of Quark Fragmentation: Comparison of Heavy (C) and Light Quarks (U,D,S).
M. Derrick. 1984, 18p ANL-HEP-PR-84-56, CONF-8406183-3
Contract W-31-109-ENG-38
15. international symposium on multiparticle dynamics, Lund, Sweden, 11 Jun 1984.
Portions are illegible in microfiche products.

The data that the author presents come from the first two years of operation of the High Resolution Spectrometer (HRS) at PEP, and correspond to an integrated luminosity of 106 +- 5 pb exp -1 (20 pb exp -1 from the first year and 86 pb exp -1 from the second year's running). Since the quark-meson transitions may have a particularly simple form at the values of the momentum fraction Z = 2p/sub meson// sqrt s, we emphasize this aspect of the data, and show how a sample of e exp + e exp - yields (u anti u, d anti d, s anti s) events can be selected. The characteristics of these events are compared to e exp + e exp - yields c anti c selected by a D* tag. (ERA citation 10:003666)

514,141
DE85000091/GAR PC A02/MF A01
Argonne National Lab., IL.
QCD Predictions for Charmonium Production in p Anti p Collisions.
E. L. Berger, P. H. Damgaard, and K. Tsokos. 1984, 7p ANL-HEP-CP-84-65, CONF-840795-1
Contract W-31-109-ENG-38
European symposium on antiproton interactions, Durham, UK, 9 Jul 1984.
Portions are illegible in microfiche products.

Within the framework of perturbative QCD, the formalism of exclusive processes is used to give predictions for the production cross section of charmonium resonances. (ERA citation 10:003687)

514,142
DE85000098/GAR PC A02/MF A01
Argonne National Lab., IL.
HRS Results on D and F Production at PEP.
J. M. Weiss. 1984, 12p ANL-HEP-CP-84-59, CONF-840757-13
Contract W-31-109-ENG-38
22. international conference on high energy physics, Leipzig, German D.R. 19 Jul 1984.
Portions are illegible in microfiche products.

Briefly summarized are the results presented for the HRS collaboration on D and F production measured at PEP. Fragmentation functions and total cross-sections for D exp 0 , D exp + , D* exp + and F exp + are reported as well as a measurement of the charmed quark electroweak asymmetry using the inclusive D exp 0 and D exp + signals in addition to three observed modes of the D* exp + yields D exp 0 transition. (ERA citation 10:003664)

514,143
DE85000233/GAR PC A02/MF A01
Brookhaven National Lab., Upton, NY.
M1-E2 Mixing Ratios of gamma-Ground Transitions in sup 168 Er.
W. Gelletly, D. D. Warner, G. C. Colvin, and K. Schreckenbach. 10 Sep 84, 4p BNL-35323, CONF-840906-7
Contract AC02-76CH00016
Capture gamma-ray spectroscopy conference, Knoxville, TN, USA, 10 Sep 1984.
Portions are illegible in microfiche products.

The L subshell ratios of four gamma -g transitions in sup 168 Er have been measured with the high resolution, iron, beta -spectrometer at the Institut Laue-Langevin. The reduced M1-E2 mixing ratios are not consistent with the values predicted by Warner on the basis of IBA-1. It may be possible to explain the results in IBA-2 in terms of the delta K = 1 mixing of the gamma-band and the pure antisymmetric states such as the 1+ isovector mode. (ERA citation 10:003806)

514,144
DE85000306/GAR PC A02/MF A01
Fermi National Accelerator Lab., Batavia, IL.
Multijet Final States: Exact Results and the Leading Pole Approximation.
R. K. Ellis, and J. F. Owens. Sep 84, 2p FNAL/C-84/78-T, CONF-8406198-9
Contract AC02-76CH03000
Design and utilization of the superconducting super collider summer study, Snowmass, CO, USA, 23 Jun 1984.
Portions are illegible in microfiche products.

Exact results for the process gg implies ggg are compared with those obtained using the leading pole approximation. Regions of phase space where the approximation breaks down are discussed. A specific example relevant for background estimates to W boson production is presented. It is concluded that in this instance the leading pole approximation may underestimate the standard QCD background by more than a factor of two in certain kinematic regions of physical interest. (ERA citation 10:003692)

514,145
DE85000581/GAR PC A02/MF A01
Argonne National Lab., IL.
Fusion and Fission in Heavy Systems Near the Barrier.
W. Henning. 1984, 12p CONF-8406156-5
Contract W-31-109-ENG-38
International conference on fusion reactions below the Coulomb barrier, Cambridge, MA, USA, 13 Jun 1984.
Portions are illegible in microfiche products.

Fusion and fission reactions have been studied near the barrier for sup 58 sup 64 Ni beams incident on all even Sn targets. Excitation functions have been measured over an energy range from well below to approx. 1.4 times the fusion barrier. We discuss the sub-barrier fusion yields, the observed fission behavior in comparison to theoretical model predictions and the possible influences of compound-nucleus structure effects at these energies near the barrier. 11 references. (ERA citation 10:003795)

514,146
DE85000588/GAR PC A02/MF A01
Brookhaven National Lab., Upton, NY.

Comprehensive and Critical Review of the Predictive Properties of the Various Mass Models.
P. E. Haustein. 1984, 7p BNL-35297, CONF-8409143-7
Contract AC02-76CH00016
International conference on atomic masses and fundamental constants (AMCO-7), Darmstadt-Seeheim, F.R. Germany, 3 Sep 1984.

Since the publication of the 1975 Mass Predictions approximately 300 new atomic masses have been reported. These data come from a variety of experimental studies using diverse techniques and they span a mass range from the lightest isotopes to the very heaviest. It is instructive to compare these data with the 1975 predictions and several others (Moeller and Nix, Monahan, Serduke, Uno and Yamada which appeared latter. Extensive numerical and graphical analyses have been performed to examine the quality of the mass predictions from the various models and to identify features in these models that require correction. In general, there is only rough correlation between the ability of a particular model to reproduce the measured mass surface which had been used to refine its adjustable parameters and that model's ability to predict correctly the new masses. For some models distinct systematic features appear when the new mass data are plotted as functions of relevant physical variables. Global intercomparisons of all the models are made first, followed by several examples of types of analysis performed with individual mass models. (ERA citation 10:003837)

514,147
DE85000626/GAR PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Study of Transfer and Breakup Reactions with the Plastic Box.
R. G. Stokstad, C. R. Albiston, M. Bantel, Y. Chan, and P. J. Countryman. Aug 84, 20p LBL-18240, CONF-840882-2
Contracts AM03-76SF00326, AC03-76SF00098
International symposium on heavy ion physics, Mt. Fuji, Japan, 27 Aug 1984.
Portions are illegible in microfiche products.

The study of transfer reactions with heavy-ion projectiles is complicated by the frequent presence of three or more nuclei in the final state. One prolific source of three-body reactions is the production of a primary ejectile in an excited state above a particle threshold. A subset of transfer reactions, viz., those producing ejectiles in bound states, can be identified experimentally. This has been accomplished with a 4 pi detector constructed of one-millimeter-thick scintillator paddles of dimension 20 cm x 20 cm. The paddles are arranged in the form of a cube centered around the target with small entrance and exit apertures for the beam and the projectile-like fragments, (PLF). The detection of a light particle (e.g., a proton or an alpha particle) in coincidence with a PLF indicates a breakup reaction. The absence of any such coincidence indicates a reaction in which all the charge lost by the projectile was transferred to the target. With this technique we have studied the transfer and breakup reactions induced by 220 and 341 MeV sup 20 Ne ions on a gold target. Ejectiles from Li to Ne have been measured at several scattering angles. The absolute cross sections, angular distributions and energy spectra for the transfer and breakup reactions are presented. Relatively large cross sections are observed for the complete transfer of up to seven units of charge (i.e., a nitrogen nucleus). The gross features and trends in the energy spectra for transfer and breakup reactions are similar. However, small differences, in particular for the widths of the energy spectra, are significant. 20 references. (ERA citation 10:003829)

514,148
DE85000656/GAR PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Microscopic Calculation for Deformed Nuclei.
Takaharu Otsuka. 24 Sep 84, 20p LA-UR-84-3086, CONF-8405231-9
Contract W-7405-ENG-36
International workshop on interacting boson-boson and boson-fermion systems, Gull Lake, MI, USA, 28 May 1984.

The microscopic basis of the Interacting Boson Model for deformed nuclei is discussed. The IBM Hamiltonian is constructed microscopically in the following two steps. In the first step, the collective nucleon pairs of J = 0 exp + (S), 2 exp + (D), etc. are mapped onto the corresponding bosons. Nucleon-nucleon interactions are also mapped onto boson-boson interactions. This mapping method for deformed nuclei was proposed recently, and it turned out that this method is consistent with the Hartree-Fock-Bogoliubov + angular momentum projection calculation. Low-lying collective states primarily consist of S and D pairs. Consequently, the corresponding boson states mainly consist of s and d bosons, while there are some admixture of g-bosons. In the second step, effects of these g-bosons are included within the s-d boson space by a unitary transformation which transforms a combination of d and g bosons into a new d-boson. By minimizing the coupling between new d and g bosons with an appropriate mixing angle, one can neglect the coupling and obtain the IBM Hamiltonian with s and d bosons. It is demonstrated that the s-d Hamiltonian thus derived indeed reproduces spectra of the original s-d-g Hamiltonian. (ERA citation 10:003853)

514,149
DE85000683/GAR PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Compression and Expansion at the Bevalac.
A. M. Poskanzer, K. G. R. Doss, H. A. Gustafsson, H. H. Gutbrod, and B. Kolb. Sep 84, 20p LBL-18357, CONF-8409149-2
Contract AC03-76SF00098
Adriatic international conference on nuclear physics: fundamental problems in heavy-ion collisions, Hvar, Yugoslavia, 24 Sep 1984.

Recent experimental results from 4 pi detectors at the Bevalac are presented, with emphasis on the Plastic Ball. Heavy nuclei, in central collisions at Bevalac energies, stop in their center of mass producing a region of equilibrated, hot matter. Some of the energy is stored as potential energy of compression. At the same time the pressure builds up, producing a sidewise collective flow of nuclear matter. The system then expands until the density is reduced so that the chemical equilibria producing the light composite nuclei freeze-out, and then even further until the thermal two body interactions freeze-out. Each of these points are discussed. 9 references. (ERA citation 10:003801)

514,150
DE85000806/GAR PC **A03**/MF **A01**
Minnesota Univ., Minneapolis. School of Physics and Astronomy.
Research in Theoretical Nuclear Physics. Progress Report, September 1983-August 1984.
B. F. Bayman, P. J. Ellis, J. I. Kapusta, and Y. C. Tang. 11 Sep 84, 41p DOE/ER/10364-72
Contract AC02-79ER10364

Progress is briefly reported on the following studies: anomalously short mean free paths in peripheral relativistic collisions, spin-dependent effects in heavy ion reactions, polarization potential for heavy ions, form factors for the collision of deformed nuclei, geometrical calculation of nucleus-nucleus reaction cross section, gamma decay of the giant quadrupole resonance, form factors for alpha -transfer reactions, the effect of channel coupling on sub-barrier fusion, study of shock and detonation waves, dynamical aspects of the nuclear matter-quark matter phase transition, study of reaction mechanisms at the energy region of BEVALAC, three-cluster resonating-group method of alpha plus two s-shell cluster systems in the coupled-channel formalism, multi-configuration resonating group study of the seven-nucleon system with realistic cluster wave functions, distortion effects in the d + sup 3 H system, pi exp + - pi exp - mass difference at finite temperature, is a spontaneously broken supersymmetry restored at positive temperature, electron-positron pair production and chiral symmetry in the hot QCD plasma, birth of the QCD plasma in a supersaturated pion vapor, proton stopping power of heavy nuclei (dynamics of proton-nucleus reactions), hydrodynamics of relativistic nucleus-nucleus collisions, status of the theory of QCD plasma, pion interferometry for exploding sources, and nucleation rate for black holes. Proposed work is summarized, and publications are listed. (ERA citation 10:003734)

514,151
DE85000847/GAR PC **A03**/MF **A01**
New York Univ., NY. Courant Inst. of Mathematical Sciences.
Computational Methods for the Nuclear and Neutron Matter Problems. Technical Progress Report.
M. H. Kalos. 26 Oct 84, 34p DOE/ER/10353-6
Contract AC02-79ER10353

Progress is reported under the following headings: mirror potential methods (approximate methods, non-local mirror potentials, and four nucleon calculations); quark clustering and nuclear matter; realistic variational calculations of nuclei; and nuclear matter variational studies. (ERA citation 10:003844)

514,152
DE85000880/GAR PC **A02**/MF **A01**
Ames Lab., IA.
Study of Magnetic Moments of Nuclear Excited States at TRISTAN.
J. C. Hill, F. K. Wohn, A. Wolf, Z. Berant, and R. L. Gill. 1984, 10p BNL-35326, CONF-8408123-1
Contract AC02-76CH00016
International symposium on nuclear orientation and nuclei far from stability, Leuven, Belgium, 28 Aug 1984.
Portions are illegible in microfiche products.

Measurement of the static magnetic dipole moments of nuclear excited states are of interest since they reveal information on nuclear structure not available by other means. A system has been constructed at the TRISTAN separator to measure magnetic dipole moments of excited states in neutron-rich nuclei using the method of perturbed angular correlations (PAC). High magnetic fields are not available through the use of a superconducting magnet. The capability of the TRISTAN system is discussed and the PAC measuring apparatus is described. Final results from recent g factor measurements at TRISTAN on 4 exp + states in the N = 82 isotones are discussed in some detail. Studies in progress are briefly outlined. (ERA citation 10:003794)

514,153
DE85000881/GAR PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
E2/M1 Mixing Ratios in sup 196 Pt from the sup 195 Pt(N, gamma) sup 196 Pt Reaction.
A. M. Bruce, and D. D. Warner. 1984, 5p BNL-35324, CONF-840906-11
Contract AC02-76CH00016
Capture gamma-ray spectroscopy conference, Knoxville, TN, USA, 10 Sep 1984.

Angular correlations in sup 196 Pt have been measured using a new two detector correlation system at Brookhaven National Laboratory (BNL). The properties of sup 196 Pt can be well described in terms of the 0(6) limit of the IBA-1 formalism and the empirical determination of mixing ratios offers a further refinement to that comparison. The measured M1 components may provide information concerning the location of the isovector mode in the 0(6) region. In addition, known correlations can provide a test of the new correlation system. 3 figures. (ERA citation 10:003819)

514,154
DE85000882/GAR PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Study of the Low-Lying States in sup 178 Hf Through the Neutron Capture Reaction.
A. M. I. Haque, R. Richter, A. Gelberg, I. Foerster, and R. Rascher. 1984, 9p BNL-35322, CONF-840906-12
Contract AC02-76CH00016
Capture gamma-ray spectroscopy conference, Knoxville, TN, USA, 10 Sep 1984.
Portions are illegible in microfiche products.

The decay of the low-lying states of sup 178 Hf was investigated using: (1) high-resolution curved crystal spectrometry of the secondary gamma -rays using the GAMS-1 and GAMS 2/3 facilities at the ILL, (2) measurements of the secondary (n,e exp -) transitions using the Electron Spectrometer BILL at the ILL, (3) measurements of the primary gamma -transitions following thermal neutron capture with the pair-spectrometer at the ILL, and (4) Average Resonance Capture (ARC) measurements at the neutron energies of 2 keV and 24 keV, using the tailored beam facilities at BNL. A level scheme including 69 levels and 270 transitions up to an excitation energy of 2.1 MeV was constructed. Most of the levels were ordered in 18 different rotational bands. The levels assigned to rotational bands, along with the deexcitation modes of the gamma -band (inset), are displayed. The level scheme of sup 178 Hf seems to be complete below 2 MeV for spins between 2 and 5. (ERA citation 10:003805)

514,155
DE85000883/GAR PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.

Statistical Methods of Spin Assignment in Compound Nuclear Reactions.
H. Mach, and M. W. Johns. 1984, 5p BNL-35321, CONF-840906-13
Contract AC02-76CH00016
Capture gamma-ray spectroscopy conference, Knoxville, TN, USA, 10 Sep 1984.
Portions are illegible in microfiche products.

Spin assignment to nuclear levels can be obtained from standard in-beam gamma-ray spectroscopy techniques and in the case of compound nuclear reactions can be complemented by statistical methods. These are based on a correlation pattern between level spin and gamma-ray intensities feeding low-lying levels. Three types of intensity and level spin correlations are found suitable for spin assignment: shapes of the excitation functions, ratio of intensity at two beam energies or populated in two different reactions, and feeding distributions. Various empirical attempts are examined and the range of applicability of these methods as well as the limitations associated with them are given. 12 references. (ERA citation 10:003738)

514,156
DE85000884/GAR PC A02/MF A01
Brookhaven National Lab., Upton, NY.
Average Resonance Capture Studies of sup 102 Ru.
Z. R. Shi, R. F. Casten, J. Stachel, and A. M. Bruce. 1984, 5p BNL-35320, CONF-840906-10
Contract AC02-76CH00016
Capture gamma-ray spectroscopy conference, Knoxville, TN, USA, 10 Sep 1984.

The sup 102 Ru nucleus has been investigated via the ARC technique which ensures a complete set of J/sup pi / = 0 exp +, 1 exp +-, 2 exp +-, 3 exp +-, 4 exp +-, and 5 exp + levels up to 2 MeV. The results are discussed in the framework of the IBA-1 with Consistent Q. The calculations show good agreement with the empirical data especially for the O sub 2+ state, suggesting that it can be described in terms of collective degrees of freedom. (ERA citation 10:003793)

514,157
DE85001114/GAR PC A02/MF A01
Oak Ridge National Lab., TN.
Beta-Delayed Proton Activities: Sup 147 Dy and sup 149 Er.
K. S. Toth, D. M. Moltz, E. C. Schloemer, M. D. Cable, and F. T. Avignone. 1984, 8p CONF-8409143-3
Contracts AC05-84OR21400, AC03-76SF00098
International conference on atomic masses and fundamental constants (AMCO-7), Darmstadt-Seeheim, F.R. Germany, 3 Sep 1984.

The present paper discusses mainly the beta -delayed proton spectra of sup 147 Dy and of the hitherto unknown isotope, sup 149 Er. However, following the submittal of the abstract for this conference we have now observed delayed protons following the decay of sup 145 Dy. Additionally, we have identified a 0.5-s delayed-proton emitter and tentatively assign it to the new isotope, sup 151 Yb. (ERA citation 10:003796)

514,158
DE85001115/GAR PC A02/MF A01
Oak Ridge National Lab., TN.
Decay Properties of sup 186 Pb and the Lead alpha-Decay Rate Anomaly.
K. S. Toth, Y. A. Ellis-Akovali, C. R. Bingham, D. M. Moltz, and H. K. Carter. 1984, 7p CONF-8409143-4
Contracts AC05-84OR21400, AC05-76OR00033
International conference on atomic masses and fundamental constants (AMCO-7), Darmstadt-Seeheim, F.R. Germany, 3 Sep 1984.

Alpha-decay transitions between ground states of doubly-even nuclei are taken to represent unhindered decays. Reduced widths for these s-wave transitions behave in a regular fashion as a function of both neutron and atomic number. They are largest for nuclei two or four particles beyond a closed shell (with sharp minima at the shell) and they then decrease as the next closure is approached. The s-wave widths for sup 186 sup 188 sup 190 sup 192 Pb, however, have been reported to behave anomalously, i.e., they purportedly increase by a factor of 30 between sup 186 Pb (N = 104) and sup 192 Ob (N = 110) instead of decreasing as one nears N = 126. Theoretical calculations have not reproduced this unusual behavior. The (electron-capture (EC) + beta exp +) strengths were deduced from K x-ray intensities. A number of corrections are involved in such determinations. We undertook the investigation of the (EC + beta exp +) decay schemes of these neutron-deficient lead isotopes, in conjunction with studies of their alpha -decay properties, to obtain more reliable alpha -branching ratios. Herein we present new information on sup 186 Pb and discuss the partial alpha half-lives for sup 192 Pb, sup 190 Pb, sup 188 Pb, and sup 186 Pb together with alpha -decay rates for even-even nuclei with Z greater than or equal to 78. (ERA citation 10:003807)

514,159
DE85001228/GAR PC A02/MF A01
Brookhaven National Lab., Upton, NY.
Low Energy Antiproton Interaction Studies at Brookhaven.
M. Sakitt, V. Ashford, M. E. Sainio, J. F. Skelly, and R. Debbe. 1984, 9p BNL-35239, CONF-840795-2
Contract AC02-76CH00016
European symposium on antiproton interactions, Durham, UK, 9 Jul 1984.

Results on antiproton quasielastic scattering on Al, Cu and Pb for two incident momenta 514 and 633 MeV/c are presented. Differential cross sections for these reactions were combined with other published data and analyzed with a nonrelativistic optical model. Absorption cross section results from our experiment are in good agreement with predictions from our optical model fits. Preliminary results are presented from p elastic scattering on hydrogen for the forward angular region in the momentum range from 360 to 652 MeV/c. We obtain small values of the ratio of the real to imaginary part of the forward scattering amplitude in this momentum interval. (ERA citation 10:003776)

514,160
DE85001236/GAR PC A02/MF A01
Brookhaven National Lab., Upton, NY.
Status of the Theory of QCD Plasma.
J. I. Kapusta. 1984, 20p BNL-35294, CONF-8406183-5
Contract AC02-76CH00016
15. international symposium on multiparticle dynamics, Lund, Sweden, 11 Jun 1984.

There is mounting evidence, based on many theoretical approaches, that color is deconfined and chiral symmetry is restored at temperatures greater than about 200 MeV. Reasonable estimates of the energy density to be expected in high energy heavy ion collisions suggest that QCD plasma may be formed in the laboratory. Proposed experimental signals may allow us to infer such quantities as the temperature, the quark dispersion relation, the space-time evolution and, perhaps, even the order of the phase transition. 52 references. (ERA citation 10:003712)

514,161
DE85001292/GAR PC A02/MF A01
Rochester Univ., NY.
Measurement of the Total Charm Production Cross Section in 350 GeV p-Fe Interactions.
A. Bodek, R. Breedon, R. N. Coleman, W. Marsh, and S. L. Olsen. 1984, 3p DOE/ER/13065-394, CONF-840757-12
Contract AC02-76ER13065
22. international conference on high energy physics, Leipzig, German D.R. 19 Jul 1984.

We have measured the distribution of prompt single muons produced in 350 GeV p-Fe and 278 GeV pi exp - -Fe interactions. Prompt single muons originate from the production and semileptonic decays of charm states. A p/sub mu />9 (GeV/c) trigger accepts almost all semileptonic decays of charm states produced with Feynman X/sub F/>0. Such data yield an almost model independent determination of the total charm production cross section (for X/sub F/>0), and provide information on the X/sub F/ and transverse momenta (P/sub t/) distributions of hadronically produced charm states. (ERA citation 10:003671)

514,162
DE85001328/GAR PC A03/MF A01
Florida Univ., Gainesville. Dept. of Physics.
Jet Topologies in Hadron-Hadron Collisions.
R. D. Field. 1984, 39p DOE/ER/40008-58, CONF-8403130-5
Contract AS05-81ER40008
Topical workshop on proton antiproton collider physics, Bern, Switzerland, 5 Mar 1984.

Event topologies in pp collisions at W = 60 GeV and in anti pp collisions at W = 540 GeV resulting from a QCD Monte-Carlo model are examined. The model includes gluon radiation both in the initial and final states and the outgoing hadrons are labeled according to whether they arise before or after the hard parton-parton collision. Transverse energy flows and transverse energy grids are studied with emphasis, not on jet finding, but on the patterns of energy deposition. These patterns are quantified by examining the multiplicity of transverse energy clusters each of which has energy greater than some fixed amount. At high transverse energy the model produces events that are slightly less two-jet like than the UA2 data. However, the predicted frequency of occurrence of three cluster events is in good agreement. 19 references. (ERA citation 10:003688)

514,163
DE85001503/GAR PC A02/MF A01
Los Alamos National Lab., NM.
Progress Report on Recent Rare Muon Decay Experiments at the Los Alamos Meson Physics Facility.
G. E. Hogan, R. D. Bolton, J. D. Bowman, R. Carlini, and M. D. Cooper. 1984, 11p LA-UR-84-2411, COO-3539-27, CONF-840789--4
Contracts W-7405-ENG-36, AC02-76ER0353
International conference on particles and nuclei, Heidelberg, F.R. Germany, 30 Jul 1984.
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A search has been performed for the decays mu yields eee, mu yields e gamma , and mu yields e gamma gamma with a sensitivity in the branching ratios at the level of 10 exp -10 . The experiment used a separated, 26 MeV/c mu exp + beam with an average intensity of 300kHz. A total of 2.2 x 10 exp 11 muon decays were examined for the present result. The detector for the experiment is the Crystal Box, which consists of a cylindrical drift chamber surrounded by 396 NaI(T1) crystals. A layer of scintillation counters in front of the crystals provided timing for electrons and veto for photons. The energy resolution for electrons and photons is approx. 6% (FWHM). The position resolution of the drift chamber is 350 mu m leading to a vertex cut with a rejection of 10 exp 3 for mu yields eee. The timing resolution is approx. 300 ps the scintillators and approx. 1 ns from the crystals. No candidate for mu yields eee has been found, yielding an upper limit for the branching ratio of B/sub mu 3e/ < 1.3 x 10 exp -10 (90% C.L.). 21 references. (ERA citation 10:003675)

514,164
DE85001671/GAR PC A02/MF A01
Oak Ridge Associated Universities, Inc., TN.
Shell Effects on the E1 Moments of Ra-Th Nuclei.
G. A. Leander. 1984, 4p CONF-840906-9
Contract AC05-76OR00033
Capture gamma-ray spectroscopy conference, Knoxville, TN, USA, 10 Sep 1984.

Large systematic shell effects on intrinsic E1 moments are found, which should modulate any E1 moment induced by beta sub 3 deformation. The calculated shell effects can explain an emerging trend for E1 data in Ra-Th nuclei, if and only if the gross beta sub 3 -induced polarization of finite nuclear matter goes in the same direction as the lightning rod effect. 16 references. (ERA citation 10:003831)

514,165
DE85001880/GAR PC A02/MF A01
Stanford Linear Accelerator Center, CA.
Coherent QCD Radiation from Active and Spectator Jets at the SSC (Superconducting Super Collider).
S. J. Brodsky. Aug 84, 2p SLAC-PUB-3429, CONF-8406198-2
Contract AC03-76SF00515
Design and utilization of the superconducting super collider summer study, Snowmass, CO, USA, 23 Jun 1984.

A gauge theory model is given which accounts for spectator jet radiation, interference effects between spectator and active jets, and coherence corrections when final state quark and gluon jets overlap. A simple Abelian complex color charge model can be used to mimic the QCD coherence effects. (ERA citation 10:003696)

514,166
DE85001881/GAR PC A02/MF A01
California Univ., Santa Cruz. Dept. of Physics.

Taus: A Probe of New W and Z Couplings.
H. E. Haber. Aug 84, 3p SLAC-PUB-3426, CONF-8406198-11
Contract AC03-76SF00515
Design and utilization of the superconducting super collider summer study, Snowmass, CO, USA, 23 Jun 1984.
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If new heavier W's and/or Z's are discovered at the SSC, only partial information on their couplings to quarks and leptons can be obtained by studying their decays into electrons and muons. In particular, without polarized beams, one cannot distinguish between heavy W's which have left-handed (W/sub L/) or right-handed (W/sub R/) couplings to all fermions. Here, we study the tau decays of W/sub L/ and W/sub R/ and compute the distributions of the tau decay products. The most striking effect is W yields tau + N followed by tau yields pi nu/sub tau/; the pT distribution of the pion can distinguish W/sub L/ from W/sub R/ (without a measurement of the pion electric charge). (ERA citation 10:003695)

514,167
DE85001938/GAR PC A02/MF A01
Brookhaven National Lab., Upton, NY.
Review of (Anti nu)/sub mu /E exp - Elastic Scattering Experiments.
M. J. Murtagh. 1984, 19p BNL-35205, CONF-8406182-3
Contract AC02-76CH00016
11. international conference on neutrino physics and astrophysics, Nordkirchen bei Dortmund, F.R. Germany, 11 Jun 1984.
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Experimental results on neutrino and antineutrino electron elastic scattering are reviewed and possible future improvements in the measurements are discussed. 15 references. (ERA citation 10:003668)

514,168
DE85002010/GAR PC A02/MF A01
California Univ., Irvine.
Preliminary Results of nu/sub E/E exp - Scattering at LAMPF.
R. C. Allen, V. Bharadwaj, G. A. Brooks, H. H. Chen, and P. J. Doe. Aug 84, 10p LA-UR-84-2764, CONF-8406158-3
Contract W-7405-ENG-36
Intersections between nuclear and particle physics conference, Dortmund, F.R. Germany, 1 Jun 1984.

We present preliminary results of a neutrino experiment in progress at LAMPF by an Irvine-Los Alamos-Maryland collaboration. We have observed a signal consistent with nu/sub e/e exp - elastic scattering, with a 15-ton sandwich detector. The number of these nu/sub e/e exp - candidates agrees with that predicted by the Weinberg-Salam electroweak theory. The corresponding sin exp 2 theta/sub w/ and total cross section are reported. This study shows that the interference of weak charged-current and weak neutral-current in nu/sub e/e exp - scattering is not constructive. We also searched for anomalous appearance of anti nu/sub e/ from the LAMPF beam stop. An upper limit for the multiplicative lepton number conservation law, and limits for anti nu/sub mu / yields anti nu/sub e/ oscillation are given. 15 references. (ERA citation 10:003676)

514,169
DE85002018/GAR PC A03/MF A01
Los Alamos National Lab., NM.
Supersymmetry in Physics, Introduction and Overview.
D. K. Campbell, and V. A. Kostelecky. 1983, 45p LA-UR-84-2861, CONF-831267-5
Contract W-7405-ENG-36
Workshop on supersymmetry in physics, Los Alamos, NM, USA, 15 Dec 1983.

Some of the basic concepts in Lie Algebra and superalgebra theory are reviewed, and then an elementary summary of each of the areas in which supersymmetry has already been applied is given. These areas include nuclear physics, condensed matter and statistical physics, and particle physics and supergravity. (ERA citation 10:003709)

514,170
DE85002026/GAR PC A02/MF A01
Oregon State Univ., Corvallis. Dept. of Physics.
Direct Mass Measurements in the Light Neutron-Rich Region Using a Combined Energy and Time-of-Flight Technique.
C. Pillai, D. J. Vieira, G. W. Butler, J. M. Wouters, and S. H. Rokni. 1984, 8p LA-UR-84-2960, CONF-8409143-5
Contract W-7405-ENG-36
International conference on atomic masses and fundamental constants (AMCO-7), Darmstadt-Seeheim, F.R. Germany, 3 Sep 1984.

Historically, masses have been determined one at a time via decay or reaction Q-value measurements. In general only after several such individual measurements could one establish a trend in the binding energies and thus develop an improved understanding of the nuclear mass surface. With the advancement of online mass spectrometers, it became possible to measure long isotopic sequences. Although only alkali elements have been extensively measured to date, this technique has proved successful in revealing sudden changes in nuclear structure and in pointing out systematic deficiencies of various mass models. In the experiment described herein, we have worked to extend mass measurement capabilities one step further with the development of a more general approach in which a whole series of nuclei can be measured simultaneously, independent of their N or Z. Below we demonstrate that direct mass measurements can be performed for fast recoiling nuclei using a combined energy and time-of-flight (i.e., M proportional to ET exp 2) technique. (ERA citation 10:003766)

514,171
DE85002060/GAR PC A02/MF A01
Valparaiso Univ., IN. Dept. of Physics.
Search for Neutrino Oscillations. Technical Progress Report, 16 November 1983-15 January 1985.
D. D. Koetke. 15 Sep 84, 18p DOE/ER/40130-1
Contract AC02-84ER40130
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Work is reported on an experiment to seek neutrino oscillations. The activities included beam line assembly, detector assembly and testing, implementation of the detector in the neutrino beam line, electronics development, and software preparation and implementation. Also, the design, construction, and testing of a prototype/model direct current magnetic focussing device to be used in the present beam line to increase the neutrino flux at the detector is reported. (ERA citation 10:003673)

514,172
DE85002095/GAR PC A03/MF A01
Colorado Univ. at Boulder.
Elementary Particles and High Energy Phenomena. Progress Report.
W. T. Ford. 1984, 36p DOE/ER/40025-13
Contract AC02-81ER40025
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During the past year, the MAC collaboration continued accumulating data at PEP and published several results. Included in the results are the lifetime measurement of b quarks; the observation of electroweak interference effects using Bhabba, mu mu , and tau tau scattering, a precise measurement of R, observations of direct photons, and a study of energy-energy correlations in multihadron events. For MkII/SLC, a vertex detector system chamber using proportional drift tubes is under construction.The Tagged Photon Spectrometer group has published results and is preparing a new experiment, E-691, to be run in January, 1985. The published results of E-516 include a study of J/psi photoproduction and a study of D exp 0 implies K exp - pi exp + pi exp 0 . An analysis of lambda exp 0 anti lambda exp 0 , and K exp 0 inclusive photoproduction has recently been completed and is being prepared for publication. Design work and preparation for prototype development has begun on the end cap drift chambers for SLD. Experiment E-400, Hadronic Charm Production, accumulated data during the first two SAVER runs at Fermilab and is now involved in data analysis. E-687, a photoproduction experiment at Fermilab, has begun construction of an electromagnetic calorimeter to measure the energy and postion photons and electrons. Novel forms of supersymmetry breaking were investigated. The anomaly and its relation to the construction of finite supersymmetric theories was studied. A long project was completed on the relation between the gluon condensate in QCD and on effective gluon mass. A series of papers was published on numerical studies of quantum Hamiltonian field theories. Studies of the confinement-deconfinement phase transition in QCD at high temperature were conducted, with applications both to the early universe and to the phenomenogy of ultrarelativistic nucleus-nucleus collisons. (ERA citation 10:003672)

514,173
DE85002162/GAR PC A02/MF A01
Lawrence Livermore National Lab., CA.
Isomer Ratio Calculations Using Modeled Discrete Levels.
M. A. Gardner, D. G. Gardner, and R. W. Hoff. 16 Oct 84, 13p UCRL-91091-Sup., CONF-840906-5-Supl.
Contract W-7405-ENG-48
Capture gamma-ray spectroscopy conference, Knoxville, TN, USA, 10 Sep 1984.

Isomer ratio calculations were made for the reactions: sup 175 Lu(n, gamma)/sup 176m,g/Lu, sup 175 Lu(n,2n)/sup 174m,g/Lu, sup 237 Np(n,2n)/sup 236m,g/Np, sup 241 Am(n, gamma)/sup 242m,g/Am, and sup 243 Am(n, gamma)/sup 244m,g/Am using modeled level structures in the deformed, odd-odd product nuclei. The hundreds of discrete levels and their gamma-ray branching ratios provided by the modeling are necessary to achieve agreement with experiment. Many rotational bands must be included in order to obtain a sufficiently representative selection of K quantum numbers. The levels of each band must be extended to appropriately high values of angular momentum. (ERA citation 10:003812)

514,174
DE85002163/GAR PC A02/MF A01
Lawrence Livermore National Lab., CA.
Absolute Dipole gamma-Ray Strength Functions for sup 176 Lu. Supplement.
D. G. Gardner, M. A. Gardner, and R. W. Hoff. 16 Oct 84, 13p UCRL-91098-Sup., CONF-840906-4-Supl.
Contract W-7405-ENG-48
Capture gamma-ray spectroscopy conference, Knoxville, TN, USA, 10 Sep 1984.

We have derived absolute dipole strength-function information for sup 176 Lu from an average resonance capture study of sup 175 Lu with 2-keV neutrons and from neutron capture cross-section measurements with neutrons from 30 keV to about 1 MeV. We found that we needed to increase our previous estimate of the relative M1/E1 strengths near 5 MeV by a factor of 3 and to revise downward the absolute magnitude of our E1 strength function. We accomplished the latter, while still maintaining continuity with the photonuclear data, by adjusting the one free parameter in our line shape. The present E1 and M1 strengths now seem correct both near the neutron separation energy and also around 1 MeV. (ERA citation 10:003813)

514,175
DE85002540/GAR PC A02/MF A01
Giessen Univ. (Germany, F.R.). Physikalisches Inst. (2).
Nuclear Structure and Reactions Studied with the Darmstadt-Heidelberg Crystal Ball.
V. Metag, R. D. Fischer, G. Koch, W. Kuehn, and R. Muehlhans. 1984, 18p CONF-840882-3
Contract W-31-109-ENG-38
International symposium on heavy ion physics, Mt. Fuji, Japan, 27 Aug 1984.

Angular momentum distribution in compound nuclei have been derived from gamma -ray multiplicities and angular distributions measured with the Darmstadt-Heidelberg crystall ball. The influence of dynamic barrier fluctuation on the amount of angular momentum absorbed in the fusion process is discussed. Entrance channel effects have been observed which result in different decay paths for compound nuclei at the same excitation energy and spin in different target-projectile combinations. The gamma -decay of resonances in the sup 12 C + sup 12 C system has been investigated. The measured gamma -ray yields are consistently smaller than expected for collectively enhanced E2 transitions in a deformed and rigidly rotating intermediate system. The order of magnitude of the experimentally observed gamma -intensity is, however, reproduced in theoretical calculations of nuclear bremsstrahlung, using realistic wave functions of the scattering states. 29 references, 10 figures. (ERA citation 10:003739)

514,176
DE85002582/GAR PC A02/MF A01
Oak Ridge National Lab., TN.
Quasimolecular Single-Nucleon Effects in Heavy-Ion Collisions.
K. A. Erb. 1984, 16p CONF-8409149-3
Contract AC05-84OR21400
Adriatic international conference on nuclear physics: fundamental problems in heavy-ion collisions, Hvar, Yugoslavia, 24 Sep 1984.
Portions are illegible in microfiche products.

Several experimental examples are discussed to illustrate that single-particle molecular orbital behavior has become an established reality in nuclear physics over the last several years. Measurements and analyses of inelastic scattering in the sup 13 C + sup 12 C and sup 17 O + sup 12 C systems, and of neutron transfer in the sup 13 C(sup 13 C, sup 12 C) sup 14 C reaction, show that the motion of valence nucleons can be strongly and simultaneously influenced by both collision partners in heavy-ion collisions. This behavior is characteristic of a molecular (single-particle) rather than a direct (DWBA) mechanism: it demonstrates that the single-particle analog of atomic molecular motion plays an important role in nuclear reactions at bombarding energies near the Coulomb barrier. Such behavior may be even more pronounced in the collisions of massive nuclei that will be studied with the new generation of heavy-ion accelerators. 19 references. (ERA citation 10:003643)

514,177
DE85002581/GAR PC A02/MF A01
Northeastern Univ., Boston, MA. Dept. of Physics.
Monte-Carlo Renormalization Group for SU(3) Lattice Gauge Theory.
R. Gupta, G. Guralnik, A. Patel, T. Warnock, and C. Zemach. Jun 84, 10p CALT-68-1143, NUB-2635
Contract AC02-76ER03130

We present the first results for the non-perturbative beta -function along the Wilson axis for the SU(3) pure gauge theory using the Monte-Carlo Renormalization Group (MCRG) method. The results show that there is no asymptotic scaling for K/sub F/ <6.1. The renormalized action generated by the sqrt 3 block transformation is also estimated for use in future calculations. (ERA citation 10:003714)

514,178
DE85002717/GAR PC A02
Stanford Linear Accelerator Center, CA.
Recent Developments in the Theory of Photon-Photon Collisions.
S. J. Brodsky. Sep 84, 4p SLAC-PUB-3440, CONF-840757-20
Contract AC03-76SF00515
22. international conference on high energy physics, Leipzig, German D.R. 19 Jul 1984.
Paper copy only, copy does not permit microfiche production. Original copy available until stock is exhausted.

Over the past few years the field of photon-photon collisions has emerged as one of the best testing grounds for QCD, particularly in the area of exclusive and inclusive hard scattering processes, exotic resonance production, and detailed tests of the coupling of real and virtual photons to the quark current. In this summary of contributed papers, I will briefly review recent theoretical progress in the analysis of two-photon reactions and possible directions for future work. 29 references. (ERA citation 10:005735)

514,179
PB85-136273 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Improved Procedure for Calculating the Collision Stopping Power of Elements and Compounds for Electrons and Positrons.
Final rept.,
S. M. Seltzer, and M. J. Berger. 1984, 12p
Pub. in International Jnl. of Applied Radiation and Isotopes 35, n7 p665-676 1984.

This paper is an addendum to an earlier paper which described a procedure and provided the data base for the quick-and-easy evaluation of electron and positron collision stopping powers. The procedure makes use of Bethe's stopping-power formula and Sternheimer's theory of the density effect, and involves a parametrization such that some parameters depend only on the particle energy and all others only on the properties of the stopping material. The data base for 278 materials has now been updated through an improved evaluation of the density effect within the framework of Sternheimer's theory. The use of the new instead of the old data base can result in stopping-power changes as large as 1 to 2 percent.

514,180
PB85-138717/GAR PC E03/MF E03
Science and Engineering Research Council, Chilton (England). Rutherford Appleton Lab.
Phenomenology of Supersymmetry with Broken R-Parity,
J. Ellis, G. Gelmini, C. Jarlskog, G. G. Ross, and J. W. F. Valle. c1984, 12p RAL-84-085

In some phenomenological supersymmetric models R-parity (+1 for particles, -1 for sparticles) is spontaneously broken along with tau lepton number (L sub tau) by a vacuum expectation value (v sub tau) of the tau sneutrino (nu sub tau). To avoid excess stellar energy loss through majorons, there should also be explicit (L sub tau) violation through right-handed neutrinos. In this paper the authors explore the phenomenological constraints on models with spontaneous violation of R-parity and (L sub tau), and propose some experimental signatures.

514,181
PB85-138725/GAR PC E03/MF E03
Science and Engineering Research Council, Chilton (England). Rutherford Appleton Lab.
Identifying Heavy Flavours with Vertex Detectors via Unusual Decay Topologies,
V. Barger, and R. J. N. Phillips. c1984, 11p RAL-84-096
Prepared in cooperation with Wisconsin Univ., Dept. of Physics.

Although top-flavored hadrons decay too quickly to leave detectable tracks, multibranch cascade decays offer distinctive topological signatures with multiple b, c and tau decay vertices emanating from a top decay. These modes are relatively copious for t(t bar) and t(b bar) (b(t bar)) systems produced at e(+)e(-) and hadron colliders, and should be recognizable by micro-vertex detectors with impact distance resolutions of order 20 micrometers or better. Multibranch cascade decay topologies are also relevant to the study of b-quarks and possible heavy quarks, charged leptons and neutrinos of the fourth generation; they occur too in multiple heavy quark production via jet fragmentation or Higgs bremsstrahlung. (Copyright (c) Science and Engineering Research Council 1984.)

514,182
PB85-138782/GAR PC E04/MF E04
Science and Engineering Research Council, Chilton (England). Rutherford Appleton Lab.
Electroweak Interference in e(+)e(-) Annihilation,
D. H. Saxon. c1984, 26p RAL-84-094

High precision results from PEP and the extended energy range of PETRA now allow accurate comparison of experimental results with theory. One-loop weak corrections have been calculated in both Weinberg-Salam and Glashow schemes and are needed in these comparisons. The (Z sup 0) propagator effect is seen and the asymmetries agree, with a 7% error, with rho = 1. The mu-pair asymmetry is a little high. The effects of normalization errors are discussed. The success of the GWS theory in the leptonic sector places limits on new phenomena. The weak isospins of c- and b-quarks have been measured and are consistent with weak isodoublets, so that a t-quark is required by the asymmetry measurements. (Copyright (c) Science and Engineering Research Council 1984.)

514,183
PB85-138808/GAR PC E03/MF E03
Science and Engineering Research Council, Chilton (England). Rutherford Appleton Lab.
Electroweak Interactions and New Particle Searches,
R. Marshall. c1984, 15p RAL-84-088

Contents: Comparison of data with theory--lepton sector; Comparison of data with theory--quark sector--(Total cross section, Flavor separation); Summary of electroweak analyses; Searches for new particles.

514,184
PB85-138881/GAR PC E03/MF E03
Science and Engineering Research Council, Chilton (England). Rutherford Appleton Lab.
Do Protons Decay,
P. J. Litchfield. c1984, 12p RAL-84-087

The experimental status of proton decay is reviewed after the Leipzig conference. A brief comparative description of the currently active experiments is given. From the overall samples of contained events, it can be concluded that the experiments are working well and broadly agree with each other. The candidates for proton decay from each experiment are examined. Although several experiments report candidates at a higher rate than expected from background calculations, the validity of these calculations is still open to doubt. (Copyright (c) Science and Engineering Research Council 1984.)

514,185
PB85-139541/GAR PC E03/MF E03
Science and Engineering Research Council, Chilton (England). Rutherford Appleton Lab.
Composite Stochastic Motions of Single Particles,
S. W. Lovesey. c1984, 24p RAL-84-091

Stochastic models of single particle motion composed of two or more different states of motion are studied in terms of the pair correlation function that determines the inelastic incoherent neutron cross-section. Two classes of model are considered. First, models in which the probability functions for individual states of motion are determined by master equations and, second, non-Markovian models in which the transition rates are time-dependent. Specific models discussed include states in which the particles undergo diffusive and harmonic motions, motion in a steady flow of fluid, or are stationary in traps for a finite time. (Copyright (c) Science and Engineering Research Council 1984.)

514,186
PB85-141513 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Electron Scattering in the Excitation Region of the Delta Resonance on Nuclei with A = 1 to 16.
Final rept.,
J. S. O'Connell, W. R. Dodge, J. W. Lightbody, X. K. Maruyama, and J. O. Adler. 22 Oct 84, 3p
Pub. in Physical Review Letters 53, n17 p1627-1629, Oct 22, 1984.

The inelastic scattering sections of H, He, Be, C and O were measured for 730 MeV electrons scattered at 37.1 degrees for energy transfers to the nucleus up to 550 MeV. The nuclear response in the delta region is found to be quite similar for the A > 1 targets. Although the differential cross section per nucleon at the peak of the delta region (380 MeV) is suppressed compared to the free nucleon, the area in the 230 - 550 MeV region is enhanced for the A > 1 targets.

514,187
PB85-143907 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Glueballs.
Final rept.,
S. Meshkov. 1984, 31p
Pub. in AIP Conference Proceedings, n113 p125-155 1984.

The current status of various glueball properties such as level ordering, masses, production, and decay is reviewed. Glueball candidates iota(1440), theta(1670), (g sub T)(2160), (g sub T)(2320), and 0(2.3-3.4) are examined. A simple model which incorporates the mixing of the glueball candidate iota(1440) with quarkonium states eta(549) and (eta prime)(958), and of the theta(1670) with f(1270) and f(1515) is presented; neither the iota(1440) nor the theta(1670) can be consistently interpreted as a glueball in this framework. A 5 x 5 model of Palmer and Pinsky which also includes radial excitation of the eta and (eta prime) yields two solutions for the pseudoscalar system, the preferred one of which has iota(1440) being mainly an s(s bar) radial excitation, and a second solution in which the iota(1440) is mixed strongly with the iota(960) and is about half bare glueball. The current leading glueball candidates are the (phi)(phi) enhancements at 2160 and 2320 MeV.

514,188
PB85-145571 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.

Experimental Verification of the D2O-Moderated 252Cf Source Spectrum.
Final rept.,
R. B. Schwartz, C. M. Eisenhauer, and J. A. Grundl.
1984, 28p
Sponsored by Nuclear Regulatory Commission, Washington, DC.
Pub. in NUREG/CR-3399, p1-28 1984.

The authors have experimentally verified the calculated spectrum for the 15 cm radius D2O-moderated (252)CF neutron source. Using NBS double fission chambers as threshold detectors, they found excellent agreement between their measurements and results derived from the calculated spectrum in the energy range below about 10 keV. The measurements do, however, suggest the existence of small, but significant, discrepancies above about 600 keV, but there is no significant net change in the fluence to dose equivalent conversion.

20I. Plasma Physics

514,189
AD-A148 627/3/GAR PC **A03/MF A01**
Naval Research Lab., Washington, DC.
SIMM1 - A Linearized Particle Code.
Memorandum rept.,
G. Joyce, and M. Lampe. 30 Nov 84, 35p Rept no. NRL-MR-5488
ARPA Order-4395

SIMM1 is a linearized particle simulation code used to study the resistive hose instability of a self-pinched, relativistic electron beam propagating in resistive plasma. The code treats the zero-order axisymmetric beam dynamics as a group of macroparticle rings. The particle dynamics associated with the hose perturbations is represented by linearized displacements of these rings from the beam axis and by bunching of the charge density around the ring. The linearization procedure presents difficulties which must be dealt with to determine the long-time behavior of the system. The axisymmetric motion of the rings occurs under the influence of an anharmonic central potential which leads to secular behavior of the orbit perturbations. We have developed a method of course graining to deal with the problem of secularities. Originator-supplied keywords include: Relativistic electron beam and Hose instability.

514,190
DE84780556/GAR PC **A05/MF A01**
International Atomic Energy Agency, Vienna (Austria). Atomic and Molecular Data Unit.
International Bulletin on Atomic and Molecular Data for Fusion. No. 24.
K. Katsonis. Jan 84, 83p INIS-mf-4754(No.24)
U.S. Sales Only.

This bulletin deals with atomic and molecular data for fusion. A bibliography for the most recent data presented in the document is provided, work in progress is briefly reported: Transport on tokamak plasmas simulation, post collisions of gold ions in helium. (Atomindex citation 15:042664)

514,191
DE85000154/GAR PC **A04/MF A01**
Oak Ridge National Lab., TN.
Transient Waveform Acquisition System for the ELMO Bumpy Torus.
K. G. Young, R. D. Burris, D. H. Hillis, and D. R. Overbey. Oct 84, 56p ORNL/TM-9201
Contract AC05-84OR21400
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The transient waveform system described in this report is designed to acquire analog waveforms from the ELMO Bumpy Torus (EBT) diagnostic experiments. Pressure, density, synchrotron radiation, etc., are acquired and digitized with a Kinetic Systems TR812 transient recorder and associated modules located in a CAMAC crate. The system can simultaneously acquire, display, and transmit sets of data consisting of identification parameters and up to 1024 data points for 1 to 64 input signals (frequency range = 0.01 pulse/s to 100 kHz) of data every one or more minutes; thus, it can run continuously without operator intervention. The data are taken on a VAX 11/780 and transmitted to a data base on a DECSystem-10. To aid the programmer in making future modifications to the system, detailed documentation using the Yourdon structural methods has been given. (ERA citation 10:001588)

514,192
DE85000183/GAR PC **A02/MF A01**
Oak Ridge National Lab., TN.
Direct Reading Fast Microwave Interferometer for EBT.
T. Uckan. Oct 84, 16p ORNL/TM-9240
Contract AC05-84OR21400

A simple and inexpensive 4-mm direct reading fast (rise time approx. 100 mu s) microwave interferometer is described. The system is particularly useful for density measurements on the ELMO Bumpy Torus (EBT) during pulsed operation. (ERA citation 10:003988)

514,193
DE85000195/GAR PC **A02/MF A01**
Lawrence Livermore National Lab., CA.
How to Run TDMFP.
A. A. Mirin. Oct 84, 9p UCID-30208
Contract W-7405-ENG-48

TDMFP is a two-dimensional, nonlinear Fokker-Planck code applicable to the time integration of the electron distribution function f/sub e/ (x,theta) in a square-well trap. Several fixed Maxwellian ionic species may be specified. Technically a multiple number of additional ionic distribution functions f/sub a/ (x,theta) may be time-integrated; this however is of questionable relevance since there is usually a large disparity between the electron and ion timescales; no applications to date have made use of this option, and the remainder of these notes do not take into consideration such additional ionic species. Problems which require the solution of Fokker-Planck equations for ions and not electrons should be run with the code HYBRID-II. The core of TDMFP is the general Fokker-Planck package FPPAC. (ERA citation 10:004002) .

514,194
DE85000275/GAR PC **A02/MF A01**
Texas Univ. at Austin. Dept. of Physics.
Alfven Wave Experiments in the PRETEXT Tokamak.
M. E. Oakes, R. D. Bengtson, S. H. Lin, R. B. Michie, and T. E. Evans. 1982, 5p CONF-820618-18
Contract AS05-77ET53042
International conference on plasma physics, Goeteborg, Sweden, 7 Jun 1982.

Alfven wave experiments below the ion cyclotron frequency have been conducted on the PRETEXT tokamak. Loading resistance measurements of both toroidal and poloidal antennas have demonstrated significant plasma loading (.1 to 2 omega) at low power levels. By appropriately phasing two poloidal loops spaced either at 90 exp 0 or 180 exp 0 toroidally, it is possible to identify toroidal modes. (ERA citation 10:003914)

514,195
DE85000380/GAR PC **A02/MF A01**
Florida Univ., Gainesville. Dept. of Physics.
Study of Opacity Effects on Line Radiation from Pellet Implosions. Final Technical Report, 11 October 1981-31 December 1983.
C. F. Hooper. Jun 84, 11p DOE/DP/40170-1
Contract AS08-82DP40170
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Glass microballoons filled with mixtures of Argon and Neon were imploded using the University of Rochester 24-beam Omega Laser system. Experimentally observed Lyman-series x-ray lines of Ar exp +17 and Ar exp +16 were analyzed to determine plasma core parameters and the effects of opacity on spectroscopic diagnostics. The helium like satellites to the Lyman alpha resonance line of Ar exp +17 and lithium-like satellites of the Lyman alpha resonance line of Ar exp +16 were resolved using an iterative peak finding code. Measured satellite line ratios were compared to new theoretical calculations in order to diagnose electron density. These calculations use a rate equation model for the satellite level populations and include the effects of autoionization, collisional mixing, inner shell excitation, and collisional ionization (and the respective inverse processes). Densities inferred in this manner from satellite line ratios are compared with densities obtained from the Stark and opacity broadening analysis. (ERA citation 10:003919)

514,196
DE85000414/GAR PC **A02/MF A01**
Oak Ridge National Lab., TN.
Time-Resolved Impurity Fluxes in the TEXTOR Plasma Edge.
R. A. Zuhr, and W. R. Wampler. 1984, 14p SAND-84-1462C, CONF-841218-4
Contract AC04-76DP00789
31. national vacuum symposium, Reno, NV, USA, 3 Dec 1984.

The internal configuration of the TEXTOR Tokamak at KFA Julich, FRG, has been modified recently to include antennas for ICRH heating of the plasma. Passive deposition probe measurements of edge impurity fluxes were made for typical ohmic discharges with this new liner configuration. The time-resolved behavior of impurities in the edge was determined as a function of radius and limiter position using rotating probe techniques. The dominant metallic impurities were found to be iron and the other components of stainless steel. Average deposited iron fluxes circulating along the field lines were found to be approx. 10 exp 15 /cm exp 2 s at 5 cm behind the limiter radius. Radial profiles of the impurities demonstrate a characteristic decrease with increasing radius outside the limiters and show an e-folding length of approx. 2.5 cm. The limiting effects of the rf antenna are also evident in the radial profiles. Present results are compared with previous measurements of edge fluxes made prior to the modifications to the plasma-side liner of TEXTOR. (ERA citation 10:003997)

514,197
DE85000746/GAR PC **A02/MF A01**
Lawrence Livermore National Lab., CA.
TMX-U Neutral Pressure Measurement Diagnostic Systems.
W. L. Pickles, S. L. Allen, D. N. Hill, A. L. Hunt, and T. C. Simonen. 14 Sep 84, 16p UCRL-91504, CONF-8409157-3
Contract W-7405-ENG-48
Topical conference on high temperature plasma diagnostics, Lake Tahoe, NV, USA, 16 Sep 1984.
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The Tandem Mirror Experiment-Upgrade (TMX-U) has a large and complex system of Baird Alpert, magnetron, and Penning gauges, in addition to mass spectrometers (RGA), all of which measure neutral pressures in the many internal regions of TMX-U. These pressure measurements are used as part of the confinement physics data base as well as for management of the TMX-U vacuum system. Dynamic pressures are modeled by a coupled-volumes simulation code, which includes wall reflux, getter pumping, and plasma pumping. (ERA citation 10:004006)

514,198
DE85000861/GAR PC **A02/MF A01**
Lawrence Livermore National Lab., CA.
Neutral Beam Injector Oxygen Impurity Measurements and Concentration Reduction Via Gettering Processes.
R. J. Kane, W. L. Hsu, R. G. Kerr, B. E. Mills, and P. Poulsen. Oct 84, 16p UCRL-91568, CONF-841218-2
Contract W-7405-ENG-48
31. national vacuum symposium, Reno, NV, USA, 3 Dec 1984.
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The reduction of oxygen impurity levels by means of gettering within the arc chambers of the TMX-U neutral beam injectors has been measured. The TMX-U Neutral Beam Test Stand was used for this experiment. Analysis incorporated silicon surface probes and optical Doppler-shift measurements of the Lyman alpha spectra of deuterium atoms with energies appropriate for D sub 2 O parentage. Without gettering, the Auger electron spectroscopy analysis of an exposed silicon sample showed a large oxygen peak below the surface peak with a concentration equivalent of approximately 2% for an accelerated beam. After gettering, with either titanium or chromium getters, the oxygen concentration was reduced by at least a factor of 10 according to optical monochromator data, and at least a factor of 8 from Auger spectroscopy data. Simultaneously, other metallic impurities were not increased substantially as a result of gettering. Additional effects observed during this study include a change in the accelerated deuterium species concentrations, loss of gettering activity and arc operation, and a change in arc performance from arc chamber gas absorption during operation. (ERA citation 10:004009)

514,199
DE85000857/GAR PC A02/MF A01
Cornell Univ., Ithaca, NY.
Field-Reversing Electron and Ion Rings for the Confinement and Heating of Plasmas. Annual Progress Report, September 1, 1983-August 31, 1984.
H. H. Fleischmann. Sep 84, 6p DOE/ET/53017-76
Contract AC02-76ET53017

Brief statements are given on the following work during this period: (1) RECE-Christa; (2) 700 keV cusp injection device; (3) model calculations; and (4) theory effort. (ERA citation 10:001560)

514,200
DE85000876/GAR PC A02/MF A01
Illinois Univ. at Urbana-Champaign. Fusion Studies Lab.
O-D Ignition Condition Analysis for an OHTE Device.
R. Scardovelli, and G. H. Miley. 1984, 6p CONF-841105-34, COO-2218-304
Contract AC02-76ET52040
Joint meeting of the American Nuclear Society and the Atomic Industrial Forum, Washington, DC, USA, 11 Nov 1984.

In the present study we examine the feasibility for heating an OHTE device to ignition with ohmic input alone. (ERA citation 10:003918)

514,201
DE85000996/GAR PC A02/MF A01
Lawrence Livermore National Lab., CA.
Electromagnetic Direct Implicit PIC Simulation.
A. B. Langdon. 29 Mar 83, 9p UCRL-88979, CONF-8209260-1
Contract W-7405-ENG-48
Workshop on flux limiter and heat flow instabilities in laser-fusion plasma, Orsay, France, 1 Sep 1982.

Interesting modelling of intense electron flow has been done with implicit particle-in-cell simulation codes. In this report, the direct implicit PIC simulation approach is applied to simulations that include full electromagnetic fields. The resulting algorithm offers advantages relative to moment implicit electromagnetic algorithms and may help in our quest for robust and simpler implicit codes. (ERA citation 10:001591)

514,202
DE85001045/GAR PC A02/MF A01
Maryland Univ., College Park.
Perpendicular Electron Cyclotron Emission from Hot Electrons in TMX-U.
R. A. James, R. F. Ellis, C. J. Lasnier, T. A. Casper, and C. M. Celata. 14 Sep 84, 13p UCRL-91503, CONF-8409157-2
Contracts AC05-77ET53044, AC03-76SF00098
Topical conference on high temperature plasma diagnostics, Lake Tahoe, NV, USA, 16 Sep 1984.

Perpendicular electron cyclotron emission (PECE) from the electron cyclotron resonant heating of hot electrons in TMX-U is measured at 30 to 40 and 50 to 75 GHz. This emission is optically thin and is measured at the midplane, f/sub ce/ approx. = 14 GHz, in either end cell. In the west end cell, the emission can be measured at different axial positions thus yielding the temporal history of the hot electron axial profile. These profiles are in excellent agreement with the axial diamagnetic signals. In addition, the PECE signal level correlates well with the diamagnetic signal over a wide range of hot electron densities. Preliminary results from theoretical modeling and comparisons with other diagnostics are also presented. (ERA citation 10:001593)

514,203
DE85001049/GAR PC A09/MF A01
Texas Univ. at Austin. Fusion Research Center.
Experimental Investigations of Driven Alfven Wave Resonances in a Tokamak Plasma Using Carbon Dioxide Laser Interferometry.
T. E. Evans. Sep 84, 189p DOE/ET/53043-12
Contract AC05-78ET53043
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The first direct observation of the internal structure of driven global Alfven eigenmodes in a tokamak plasma is presented. A carbon dioxide laser scattering/interferometer has been designed, built, and installed on the PRETEXT tokamak. By using this diagnostic system in the interferometer configuration, we have for the first time, thoroughly investigated the resonance conditions required for, and the spatial wave field structure of, driven plasma eigenmodes at frequencies below the ion cyclotron frequency in a confined, high temperature, tokamak plasma. (ERA citation 10:001561)

514,204
DE85001179/GAR PC A02/MF A01
Florida Univ., Gainesville. Dept. of Physics.
X-Ray Line Broadening as a Diagnostic in Laser Produced Plasma. Final Technical Report, 4 August 1982-3 August 1983.
C. F. Hooper. Jun 84, 6p DOE/DP/40159-2
Contract AS08-81DP40159

The theoretical line broadening research carried out under this contract involved two main areas: calculation of: (1) widths, shifts, and asymmetries of Stark broadened Lyman series lines from high-Z hydrogenic radiators in dense plasmas, (2) opacity effects on hydrogenic and helium-like lines and satellite diagnostics. (ERA citation 10:003918)

514,205
DE85001209/GAR PC A03/MF A01
Lawrence Livermore National Lab., CA.
Edge Diagnostics for Tandem Mirror Machines.
S. L. Allen. 14 Sep 84, 28p UCRL-91500, CONF-8409157-4
Contract W-7405-ENG-48
Topical conference on high temperature plasma diagnostics, Lake Tahoe, NV, USA, 16 Sep 1984.

The edge plasma in a tandem mirror machine shields the plasma core from cold neutral gas and impurities. A variety of diagnostics are used to measure the fueling, shielding, and confinement of the edge plasma in both the end plug and central cell regions. Fast ion gauges and residual gas analyzers measure the gas pressure and composition outside of the plasma. An array of Langmuir probes is used to measure the electron density and temperature. Extreme ultraviolet (euv) and visible spectroscopy are used to measure both the impurity and deuterium densities and to estimate the shielding factor for the core plasma. The linear geometry of a tandem mirror also allows direct measurements of the edge plasma by sampling the ions and electrons lost but the ends of the machine. Representative data obtained by these diagnostics during operation of the Tandem Mirror Experiment (TMX) and Tandem Mirror Experiment-Upgrade (TMX-U) experiments are presented. Diagnostics that are currently being developed to diagnose the edge plasma are also discussed. (ERA citation 10:004005)

514,206
DE85001277/GAR PC A02/MF A01
Oak Ridge National Lab., TN.
Atomic Processes Involving Impurities in the Plasma Edge.
R. A. Phaneuf. 1984, 25p DOE/OR/21400-T48
Contract AC05-84OR21400

A brief overview and bibliography is given of collisional processes involving common plasma impurities which play important roles in the edge or scrape-off plasma region of magnetically-confined fusion devices. An assessment is given of the status of the existing atomic-collision data base, of current and proposed data needs, and of forthcoming developments which are likely to augment this data base during the next few years. (ERA citation 10:001562)

514,207
DE85001842/GAR PC A02/MF A01
California Univ., Los Angeles. Dept. of Physics.
Role of Cavitons in Laser-Plasma Interactions. Final Report, August 15, 1983-August 14, 1984.
A. Y. Wong, T. Tanikawa, and P. Y. Cheung. Jul 84, 19p DOE/DP/40187-1
Contract AS08-83DP40187

The trapping of electron plasma waves inside a caviton has been observed after the termination of the driving fields in a one-dimensional inhomogeneous plasma. The observed characteristics of trapped waves verify quantitatively the predictions of the Zakharov equations. We have further demonstrated the existence of trapped eigenmodes in the caviton experimentally using a novel two-frequency excitation technique. The interaction of these eigenmodes among themselves causes the plasma to emit electromagnetic radiations in strong turbulent state. Preliminary results of microwave-plasma interaction and scaling of caviton fields with the plasma density are also presented. (ERA citation 10:003920)

514,208
DE85002126/GAR PC A02/MF A01
Princeton Univ., NJ. Plasma Physics Lab.
Measurements of Low Energy Neutral Hydrogen Efflux During ICRF Heating.
S. A. Cohen, D. Ruzic, D. E. Voss, R. Budny, and P. Colestock. Sep 84, 22p PPPL-2133
Contract AC02-76CH03073

Using the Low Energy Neutral Atom Spectrometer, measurements were made of the H exp 0 and D exp 0 efflux from PLT during ion cyclotron heating experiments. The application of rf power at frequencies appropriate to fundamental and 2nd-harmonic heating results in a rapid, toroidally uniform rise in the charge-exchange efflux at a rate of about 10 exp 15 cm exp -2 s exp -1 MW exp -1 . This flux increase is larger at lower plasma currents. The cause of this flux and its impact on plasma behavior are discussed. (ERA citation 09:048843)

514,209
DE85002136/GAR PC A08/MF A01
Department of Energy, Washington, DC. Office of Fusion Energy.
1984 Review of the Applied Plasma Physics Program.
Sep 84, 104p DOE/ER-0063

This report describes the present and planned programs of the Division of Applied Plasma Physics (APP), Office of Fusion Energy. The major activities of the division include fusion theory, experimental plasma research, advanced fusion concepts, and the magnetic fusion energy computer network. The planned APP program is consistent with the recently issued Comprehensive Program Management Plan for Magnetic Fusion Energy, which describes the overall objectives and strategy for the development of fusion energy. (ERA citation 10:003921)

514,210
DE85002170/GAR PC A02/MF A01
Lawrence Livermore National Lab., CA.
X-Ray Spectroscopy of Laser-Produced Plasmas.
R. L. Kauffman. Aug 84, 6p UCRL-91411, CONF-8408124-1
Contract W-7405-ENG-48
International colloquium oin EUV and X-ray spectroscopy of astrophysical and laboratory plasmas, Washington, DC, USA, 27 Aug 1984.

A brief discussion is given of the importance of x-ray spectroscopy as a diagnostic tool for laser-produced plasma. Of particular note is the role of opacity and time dependence. (ERA citation 10:004004)

514,211
DE85002174/GAR PC A03/MF A01
Texas Univ. at Austin. Inst. for Fusion Studies.
Enhancement of Tokamak Ion Transport Due to Electron Collisions.
A. A. Ware. Oct 84, 33p DOE/ET/53088-158, IFSR-158
Contract FG05-80ET53088

In tokamas where auxiliary ion heating leads to T/sub i/ > T/sub e/, the neglect of electron collisions is no longer a good approximation in determining ion transport coefficients. The enhancement of the ion heat conduction due to electron collisions is determined for (a) the Pfirsch-Schluter regime and (b) the banana regime for the case where Z/sub eff//sup i/ is large. The enhancement of ion viscosity is particularly important; the contribution due to ion-electron-collisions is approximately equal to the ion-ion-collision term even for T/sub i/ = T/sub e/. (ERA citation 10:003925)

514,212
DE85002175/GAR PC A04/MF A01
Oak Ridge National Lab., TN.
Theory of Resistivity-Gradient-Driven Turbulence.
L. Garcia, B. A. Carreras, P. H. Diamond, and J. D. Callen. Oct 84, 59p DOE/ET/53088-146, IFSR-146
Contracts AC05-84OR21400, FG05-80ET53088

A theory of the nonlinear evolution and saturation of resistivity-driven turbulence, which evolves from linear

rippling instabilities, is presented. The nonlinear saturation mechanism is identified both analytically and numerically. Saturation occurs when the turbulent diffusion of the resistivity is large enough so that dissipation due to parallel electron thermal conduction balances the nonlinearly modified resistivity gradient driving term. The levels of potential, resistivity, and density fluctuations at saturation are calculated. A combination of computational modeling and analytic treatment is used in this investigation. (ERA citation 10:003924)

514,213
DE85002176/GAR PC **A02**/MF **A01**
Texas Univ. at Austin. Inst. for Fusion Studies.
Role of Multiple Helicity Nonlinear Interaction of Tearing Modes in Dynamo and Anomalous Thermal Transport in the Reversed Field Pinch.
Z. G. An, P. H. Diamond, R. D. Hazeltine, J. N. Leboeuf, and M. N. Rosenbluth. Oct 84, 24p DOE/ET/53088-159, CONF-840910-19
Contract FG05-80ET53088
10. international conference on plasma physics and controlled nuclear fusion research, London, UK, 12 Sep 1984.

A theory of magnetic fluctuation dynamics, the dynamo mechanism, and anomalous thermal transport in the Reversed Field Pinch is presented. Nonlinear generation of and coupling to m greater than or equal to 2 modes is advanced as an m=1 tearing modes sustain the magnetic configuration and stabilize themselves by lowering the safety factor on axis (q(0)) are elucidated. The nonlinear dynamics of resistive interchange modes is discussed. Stochastic magnetic field transport arguments are used to estimate anomalous thermal conductivity and confinement scalings. (ERA citation 10:003926)

514,214
DE85002252/GAR PC **A02**/MF **A01**
GA Technologies, Inc., San Diego, CA.
Intensified CCD Camera System for Plasma Diagnostics.
J. Smith, R. Chase, J. Garcia, C. Hsieh, and D. Vaslow. Sep 84, 18p GA-A-17712, CONF-840922-19
Contract AT03-84ER51044
APS topical conference on high temperature plasma diagnostics, Tahoe City, CA, USA, 16 Sep 1984.

It is possible to put together an intensified imaging system which has about the same sensitivity as photomultiplier tubes. Such a camera system, which utilizes a combination of image intensifiers and CCD image sensor, was constructed recently for the multipoint Thomson scattering diagnostic on Doublet III. In our case, the incoming image is first gated and amplified in the intensifier stages, then lens-coupled to a CCD camera cooled to LN sub 2 temperature. The camera contains a RCA back-illuminated CCD of 320 x 512 pixels, has a good quantum efficiency (approx. 85% at 550 nm), and has a noise level per pixel of about 60 electrons. The system is controlled through CAMAC with a Photometric camera controller which allows a number of pictures to be taken and stored on the CCD chip for later readout. The multipicture capability is convenient for use with a multipulse Thomson scattering diagnostic to provide n/sub e/ and T/sub e/ profile measurements at several time points in a plasma shot. It is conceivable also that the camera system can be utilized to view directly the 2-D spatial distribution of plasma radiation at a particular energy in the range from near infrared to soft X-rays for information relating to plasma activities on flux surfaces. (ERA citation 10:003931)

514,215
DE85002337/GAR PC **A03**/MF **A01**
California Univ., Berkeley.
Electron Acceleration. Technical Progress Report.
11 Oct 84, 38p DOE/ER/40136-T1
Contract AT03-84ER40136
Portions are illegible in microfiche products.

The idea for charged particle acceleration by Gaussian laser beams has been analyzed in detail, considering the beam modes best suited for the purpose and taking into account the possibility of using a gas with optimum refraction index. The approach used involves a normalization of both laser beam and electron trajectory parameters which results in computed curves and expressions valid for any beams and trajectories within the assumptions made for the analysis. Various laser modes correspond to different values of constants. As the main purpose of this study is to evaluate quantitatively the practical usefulness of this type of interactions for high-energy particle production, only optimized linear trajectories at velocities near the vacuum light velocity are considered. A relationship between particle energy, gas index of refraction and trajectory angle is derived. This relationship is a generalization of the high-energy Cherenkov condition for cumulative interaction with a single plane wave, and it shows that higher gas pressure is needed for laser modes giving larger energy transfer to the electrons. (ERA citation 10:003922)

514,216
DE85002340/GAR PC **A03**/MF **A01**
Los Alamos National Lab., NM.
Resistive Evolution of General Plasma Configurations.
G. Miller. Sep 84, 29p LA-10178-MS
Contract W-7405-ENG-36

The resistive evolution through equilibrium states of general plasma configurations with closed magnetic field lines is described. Cases where the magnetic field forms magnetic surfaces and where the magnetic field is ergodic are treated. In the former case, a simple equation for the rate of change of rotational transform at fixed values of toroidal flux is obtained, as is already known. In the latter case the evolution of the equilibrium is naturally described in terms of the magnetic helicity by use of the formalism of relaxed states introduced by J.B. Taylor. The equation for rate of change of magnetic helicity is shown to be a general law of resistive evolution, implying the former equation for rotational transform in the case of magnetic surfaces. In principle, the resistive evolution model provides a complete description of global long-time-scale plasma behavior in the limit where the plasma density vanishes. In this limit, the magnetohydrodynamic description of a plasma is not practical because of the vanishing of the inertial time scale. (ERA citation 10:003983)

514,217
DE85002386/GAR PC **A02**/MF **A01**
Los Alamos National Lab., NM.
FRC Translation Dynamics and Plasma Confinement Properties in FRX-C/T.
D. J. Rej, M. Tuszewski, W. T. Armstrong, R. E. Chrien, and P. L. Klinger. 1984, 12p LA-UR-84-3289, CONF-8411111-2
Contract W-7405-ENG-36
Japan/US joint symposium on compact toroid research, Hiroshima, Japan, 13 Nov 1984.

In the FRX-C/T experiment field-reversed configuration plasmas are translated over 16 meters without inducing instabilities or enhanced transport. The plasmas are formed in either a puff or static D sub 2 fill and they are accelerated to axial speeds of up to the ion thermal velocity. The observed acceleration dynamics agree with 2-D MHD simulations. When translated into reduced external magnetic fields, FRCs are observed to accelerate, expand, and cool in approximate agreement with adiabatic theory. The plasmas reflect from an external mirror with negligible loss in thermal energy, particle inventory, and poloidal magnetic flux. After each reflection the axial kinetic energy is reduced by approximately 50%. Because of this reduction, FRCs are readily trapped without the need of pulsed gate magnet coils. Translation has also allowed the scaling of FRC confinement over an extended parameter space with plasma dimensions, temperatures, and densities varying by factors of 2 to 4. An empirical scaling law of the observed nonclassical particle confinement shows departures from the lower-hybrid-drift scaling. Particle transport accounts for approximately one-half of the total energy loss. The confinement parameter, n tau/sub E/ approx. = 10 exp 11 s/cm exp 3 , is observed with n approx. = 10 exp 15 cm exp -3 and T/sub i/ approx. = 0.6 keV. (ERA citation 10:003984)

514,218
DE85002418/GAR PC **A02**/MF **A01**
Los Alamos National Lab., NM.
Radiation and Impurity Measurements in FRX-C/T.
R. E. Chrien, K. F. McKenna, D. J. Rej, and M. Tuszewski. 13 Nov 84, 6p LA-UR-84-3368, CONF-8411111-1
Contract W-7405-ENG-36
Japan/US joint symposium on compact toroid research, Hiroshima, Japan, 13 Nov 1984.

Translation of Field-Reversed Configurations (FRCs) in the FRX-C/T device has provided better diagnostic access for radiation measurements. It is observed that radiated power accounts for 7 +- 2% of the total power losses, indicating that thermal conduction accounts for about half of the losses. It was determined through impurity seeding experiments that the oxygen fraction is 0.6 +- 0.2% and that oxygen can account for most of the radiated power. (ERA citation 10:003985)

514,219
DE85002464/GAR PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Feasibility of alpha Particle Measurement by CO sub 2 Laser Thomson Scattering.
D. P. Hutchinson, K. L. Vander Sluis, and J. Sheffield. 1984, 3p CONF-8410177-1
Contract AC05-84OR21400
International conference on infrared and millimeter waves, Takarazuka, Osaka, Japan, 22 Oct 1984.
Portions are illegible in microfiche products.

The feasibility of scattering CO sub 2 laser radiation from a multi-component burning plasma has been evaluated for the measurement of the velocity distribution of D-T produced alpha particles. The density and velocity distribution of the alpha particles from their initial energy of 3.5 MeV down to near-thermal energies may be measured by small angle (<1 exp 0) Thomson scattering. A computer simulation of the experiment indicates that a 100 MW pulsed laser combined with a bank of heterodyne receivers will be able to measure a scattered signal due to the alpha particles for an assumed alpha density of 5 x 10 exp 11 cm exp -3 . (ERA citation 10:003917)

514,220
DE85002701/GAR PC **A03**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Electron Temperature Measurements During Electron Cyclotron Heating on PDX Using a Ten Channel Grating Polychromator.
A. Cavallo, H. Hsuan, D. Boyd, B. Grek, and D. Johnson. Oct 84, 34p PPPL-2150
Contract AC02-76CH03073

During first harmonic electron cyclotron heating (ECH) on the Princeton Divertor Experiment (PDX) (R sub 0 = 137 cm, a = 40 cm), electron temperature was monitored using a grating polychromator which measured second harmonic electron cyclotron emission from the low field side of the tokamak. Interference from the high power heating pulse on the broadband detectors in the grating instrument was eliminated by using a waveguide filter in the transmission line which brought the emission signal to the grating instrument. Off-axis (approx. 4 cm) location of the resonance zone resulted in heating without sawtooth or m = 1 activity. However, heating with the resonance zone at the plasma center caused very large amplitude sawteeth accompanied by strong m = 1 activity: delta T/T/sub MAX/ approx. = 0.41, sawtooth period approx. = 4 msec, m = 1 period approx. = 90 mu sec, (11 kHz). This is the first time such intense MHD activity driven by ECH has been observed. (For both cases there was no sawtooth activity in the ohmic phase of the discharge before ECH.) At very low densities there is a clear indication that a superthermal electron population is created during ECH. (ERA citation 10:003991)

514,221
DE85002708/GAR PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Electron Energy Transport and Magnetic Curvature Driven Modes.
B. Coppi, and W. M. Tang. Oct 84, 10p PPPL-2151
Contract AC02-76CH03073
Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A transport coefficient for anomalous electron thermal conduction is constructed on the basis of the so-called Principle of Profile Consistency. It is assumed that the relevant modes in plasma where a substantial fraction of the electron population is magnetically trapped produce magnetic reconnection at a microscopic level and are driven by the combined effects of the plasma pressure gradient and the magnetic field curvature. Consequently, the scaling for the electron energy confinement time exhibits a strongly favorable dependence on the radius of magnetic curvature. (ERA citation 10:003992)

514,222
DE85002722/GAR PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.

Comparison of the Theory and the Practice of RF Current Drive.
C. F. F. Karney, N. J. Fisch, and F. C. Jobes. Oct 84, 14p PPPL-2152
Contract AC02-76CH03073

The theory of rf-driven plasma currents is applied to the lower-hybrid experiments on the PLT tokamak. Particular emphasis is placed on those experiments in which the plasma current was varying. The comparison between theory and experiment is made with respect to the efficiency with which rf energy was converted to poloidal magnetic field energy. Good agreement is found irrespective of whether the current was increasing, constant, or decreasing. (ERA citation 10:003993)

514,229
DE85002723/GAR PC A03/MF A01
Princeton Univ., NJ. Plasma Physics Lab.
Reduced Equations for Finite beta Tearing Modes in Tokamaks.
R. Izzo, D. A. Monticello, J. DeLucia, W. Park, and C. M. Ryu. Oct 84, 45p PPPL-2148
Contract AC02-76CH03073

The equations of resistive magnetohydrodynamics (MHD) are recast in a form that is useful for studying the evolution of those toroidal systems where the fast magnetosonic wave plays no important role. The equations are exact and have nabla vector.B vector = O satisfied explicitly. From this set of equations it is a simple matter to derive the equations of reduced MHD to any order in the inverse aspect ratio epsilon of the torus, and for beta approx. epsilon or smaller. We demonstrate this by deriving a reduced set of MHD equations that are correct to 5th order in epsilon. These equations contain the exact equilibrium relation and as such can be used to find 3-D stellarator equilibria. In addition, if a subsidiary ordering in eta, the resistivity, is made, the equations of Glasser, Greene, and Johnson are recovered. This set of reduced equations has been coded by extending the initial value code, HILO. Results obtained, for both ideal and resistive linear stability, from the reduced equations are compared with those obtained by solving the full set of MHD equations in a cylinder. The agreement is shown to be excellent for both zero and finite beta calculations. Comparisons are also made with analytic theory illuminating the present limitations of the latter. (ERA citation 10:003990)

514,224
DE85002725/GAR PC A04/MF A01
Princeton Univ., NJ. Plasma Physics Lab.
Tokamak Ion Temperature and Poloidal Field Diagnostics Using 3 MeV Protons.
W. W. Heidbrink, and J. D. Strachan. Oct 84, 65p PPPL-2136
Contract AC02-76CH03073
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The 3 MeV protons created by d(d,p)t fusion reactions in a moderately sized tokamak leave the plasma on trajectories determined by the position of their birth and by the poloidal magnetic field. Pitch-angle resolution of the escaping 3 MeV protons can separately resolve the spatial distribution of the d(d,p)t fusion reactions and the poloidal field distribution inside the tokamak. These diagnostic techniques have been demonstrated on PLT with an array of collimated surface barrier detectors. (ERA citation 10:003989)

514,225
N85-12894/4/GAR PC A03/MF A01
Stichting voor Fundamenteel Onderzoek der Materie, Jutphaas (Netherlands). Inst. voor Plasma-Fysica.
High Transmission, 20 Channel Polychromator for the Thomson Scattering Diagnostic of TORTUR 3.
C. J. Barth. Jun 84, 39p REPT-84-156
Sponsored by Euratom and Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek (Zwo).

In order to study Thomson-scattered spectra observed in TORTUR plasma, which show systematic deviations with respect to a Gaussian profile, a 20-channel spectrometer was designed and constructed to replace a 10-channel apparatus. The transmission of the spectrometer is increased by a factor 2.5 to 45% by using wavelength selection mirrors instead of fiber optics to direct the analyzed spectrum to the photomultiplier array. Electron temperatures and densities can be determined with a 5% error at values of 800 eV and 5 times 10 to the 19th power/cum. The detection limit of the diagnostic is improved to ne = 3 times 10 to the 16th power/cum at Te = 500 eV.

514,226
PB85-142040 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Discussion of the Conditional Probability Function for Electric Fields in a Plasma.
Final rept.,
R. Stamm, and E. Smith. Jul 84, 14p
Pub. in Physical Review A 30, n1 p454-467 Jul 84.

The conditional-probability function plays a central role in the development of stochastic models for spectral line shapes in plasmas. The authors discuss some of the physical properties of this function, using various analytic models as well as the results of a computer simulation.

20J. Quantum Theory

514,227
DE84002743/GAR PC A02/MF A01
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Clusterization in a Class of Models of the Classical Field Theory.
V. G. Makhankov. 1983, 6p JINR-E-2-83-642
U.S. Sales Only.

Using as an example simple nonlinear field theory problems of soliton existence, stability, dynamics, and statistics are discussed for the U(p, q) internal symmetry group in the space-time Rsub(D, 1). A number of mathematical and physical models belonging to this class are considered, in particular, the SG, phi-four theory, a nuclear model phi exp 4 - a phi exp 6 , the Nonlinear Schroedinger Equation (NLS), and the Landau-Lifshitz model gauge equivalent to the last one. Existence of small amplitude expansions is shown to allow calculating the soliton form factors for not only solvable models such as SG, NLS and LL in Rsub(1,1) space but for a broader class of models in Rsub(D, 1), too. Soliton stability properties imply clustering (soliton creation) to occur at finite temperature in the framework of nonlinear-space dimensional models considered and may be regarded as a phase transition. (Atomindex citation 15:042355)

514,228
DE85002005/GAR PC A03/MF A01
California Univ., Berkeley. Lawrence Berkeley Lab.
Geometric Hamiltonian Structures and Perturbation Theory.
S. Omohundro. Aug 84, 31p LBL-18302, CONF-840794-1
Contract AC03-76SF00098
NRL-NSWC workshop on local and global methods of dynamics, Silver Spring, MD, USA, 23 Jul 1984.

We have been engaged in a program of investigating the Hamiltonian structure of the various perturbation theories used in practice. We describe the geometry of a Hamiltonian structure for non-aingular perturbation theory applied to Hamiltonian systems on symplectic manifolds and the connection with singular perturbation techniques based on the method of averaging. (ERA citation 10:003890)

514,229
DE85002523/GAR PC A02/MF A01
Rochester Univ., NY.
Search for Anomalous Gravitational Effects at the Fermilab Accelerator. Progress Report on E-723.
P. Reiner, J. Rogers, W. Wuensch, A. C. Melissinos, and W. B. Fowler. Oct 84, 14p FNAL/Pub-84/97-E
Contract AC02-76CH03000
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This is a progress report on the results of tests of a gravitational detector operated in the CO area of the Fermilab accelerator in June and July of this year. Our experience so far is that these measurements are feasible and we have set a limit on the ratio of the coupling of a long range to that of the gravitational constant of g/G < 3x10 exp 20 . The sensitivity of the experiment is evaluated to be 0.5x10 exp 6 times lower than for the test-run and should be achieved during the forthcoming fixed target operating period. (ERA citation 10:003549)

20K. Solid Mechanics

514,230
AD-A148 786/7/GAR PC A02/MF A01
Army Armament Research and Development Center, Watervliet, NY. Large Caliber Weapon Systems Lab. (Field Unit).
Compliance of a Three-Point Bend Specimen at Load Line.
Final rept.,
F. M. Haggag, and J. H. Underwood. Oct 84, 12p ARLCB-MR-84035, SBI-AD-E440 260

Load-line displacement information for the three-point bend specimen is presented and compared with information from the literature, with emphasis on the needs of those performing fracture tests.

514,231
N85-12385/9/GAR PC A02/MF A01
UKAEA Atomic Energy Research Establishment, Harwell (England).
Eta Values for Compact Geometry Specimens to Calculate the J Integral.
G. P. Gibson. Jun 84, 13p AERE-R-11126

In determinations of elastic/plastic fracture toughness the eta factor relates the J integral to the area under the load versus load-time displacement trace. In the case of the compact geometry eta is generally equated to the plastic eta value (eta sub p), for which three analytical solutions were previously suggested. The approaches used to derive these solutions are discussed and compared with experimentally determined eta values.

514,232
N85-12386/7/GAR PC A02/MF A01
UKAEA Atomic Energy Research Establishment, Harwell (England).
Experimental Evaluation of the J Integral in 50% Sidegrooved Compact Geometry Specimens.
G. P. Gibson, M. Wilmshurst, and S. G. Druce. May 84, 22p AERE-R-11202

In experiments to measure fracture toughness, the J integral is conventionally determined from the area under the load versus displacement trace, the remaining ligament area and the eta factor. The Merkle and Corten solution is generally used for the eta factor for non-side grooved compact geometry specimens. This paper describes an investigation of the effect of side grooving a compact geometry specimen by 50%, on the J determination. The results show that a correction to the conventionally calculated J value should be made, due to changes in the plastic eta value, eta p, and the plastic deformation in the specimen flanks. Outside the linear-elastic regime this correction factor is 0.76.

514,233
N85-12387/5/GAR PC A03/MF A01
UKAEA Atomic Energy Research Establishment, Harwell (England).
Comparison of Methods for Predicting Ductile Crack Growth Instability.
G. P. Gibson, and S. G. Druce. May 84, 37p AERE-R-11199

Two approaches have been suggested to predict the conditions for instability resulting from ductile crack propagation from a pre-existing defect. These are the T approach of Paris et al., and the I approach of Turner. The Paris T approach is based on the stability of the equilibrium state between the applied value of the J integral and the J versus crack extension material resistance curve. Under linear elastic conditions instability may be interpreted as occurring when the second differential of available energy exceeds that required for crack extension. The Turner approach, on the other hand, is based on the balance between the energies available and required for crack extension. A comparison of the two approaches has been carried out by re-analyzing the instability results of Paris et al., obtained using single-edge-notched, three-point bend specimens under conditions where the J integral can be considered as a crack tip field characterizing parameter. Under these conditions both approaches, although based on different assumptions, are numerically similar and the predicted conditions for instability are in good agreement with experimental results.

514,234
N85-12642/3/GAR PC **A02/MF A01**
Oxford Univ. (England).
Removal of Singularities in Tresca and Mohr-Coulomb Yield Functions.
S. W. Sloan, and J. R. Booker. 1984, 20p OUEL-1528/84, SM05O/84
Sponsored by Australian Research Grants Scheme.

A modified yield function to round-off the vertices in the Tresca and Mohr-Coulomb yield functions is derived. The fitting procedure enforces continuity of slope between the modified yield function and the original yield functions, thus ensuring that the overall yield function is differentiable for all stress values. The modified yield function is used in the vicinity of the vertices and is given in a form suitable for finite element programming. The Tresca and Mohr-Coulomb yield functions can be approximated as closely as desired by adjusting one parameter.

514,235
N85-12643/1/GAR PC **A02/MF A01**
Technische Hochschule, Darmstadt (Germany, F.R.).
Integral Equation Formulation for a Boundary Value Problem of Elasticity in the Domain Exterior to an Arc.
G. C. Hsiao, E. P. Stephan, and W. L. Wendland. Jul 84, 14p PREPRINT-833
Submitted for Publication Sponsored by Alexander von Humboldt-Stiftung, West Germany.

A Dirichlet problem for the two-dimensional linear elasticity equation in the domain exterior to an open arc in the plane is considered. It is shown that the problem can be reduced to a system of boundary integral equations with the unknown density function being the jump of stresses across the arc. Existence, uniqueness, and regularity results for the solution to the boundary integral equations are established in Sobolev spaces. Asymptotic expansions concerning the singular behavior for the solution near the tips of the arc are obtained. By adding special singular elements to the regular splines as test and trial functions, an augmented Galerkin procedure is used for the corresponding boundary integral equations to obtain a quasi-optimal rate of convergence for the approximate solutions.

514,236
PB85-138352/GAR PC **E04/MF E04**
National Physical Lab., Teddington (England). Div. of Material Applications.
Large Transverse Deflections of Circular Plates Loaded Symmetrically,
D. H. Ferriss. c1984, 46p NPL-DMA-A-86

Differential equations representing the equilibrium of circular plates subjected to symmetric lateral loading are presented in which both bending and membrane forces are taken into account. Three types of edge conditions are considered together with uniform, disc and ring loading conditions. The equations are solved numerically using a finite difference technique. As deflections increase, it is shown how the solutions tend to those given by the membrane problem in which bending effects are ignored. The general membrane problem is also treated numerically and a series solution developed for the uniformly loaded case. (Copyright (c) Crown Copyright 1984.)

20L. Solid-State Physics

514,237
AD-A148 710/7/GAR PC **A02/MF A01**
University of Wales Inst. of Science and Technology, Cardiff. Dept. of Physics, Electronics, an Electrical Engineering.
Optimisation of the Thermoelectric Figure of Merit in Fine Grained Semiconductor Materials Based upon Lead Telluride,
Initial rept.,
D. M. Rowe, and C. M. Bhandari. Sep 82, 3p
Contract DAJA37-82-A-0116

It has been reported that grain boundary scattering has a significant effect in reducing the lattice thermal conductivity of silicon germanium alloys. This phenomenon does not appear to be accompanied by a deterioration in the other parameters which occur in the thermoelectric figure of merit. Consequently, small grain size silicon germanium alloys exhibit a higher figure of merit than comparable 'single crystal' or large grain size material. Although grain boundary scattering of phonons is particularly favored in silicon germanium alloys because the large difference in atomic masses of the constituent atoms give rise to substantial alloy disorder scattering, this phenomenon will also be present in other thermoelectric semiconductor alloys.

514,238
AD-A148 720/6/GAR PC **A02/MF A01**
University of Wales Inst. of Science and Technology, Cardiff. Dept. of Physics, Electronics, an Electrical Engineering.
Optimisation of the Thermoelectric Figure of Merit in Fine Grained Semiconductor Materials Based upon Lead Telluride.
Final rept.,
D. M. Rowe, and C. M. Bhandari. Apr 84, 9p
Contract DAJA37-82-C-0016

This report although referred to as final, actually covers progress made during the period January to March 1984. The next step in this investigation was the development of a theoretical model which would enable a realistic estimate to be made of the absolute magnitude of the thermoelectric figure of merit Z of materials based upon lead telluride. In report No 4 we reported the results of a preliminary investigation into the effect of including a multivallied energy band structure in our model; this was an essential step as all established thermoelectric materials, including those based upon lead telluride possess such an energy band structure. In addition to possessing a multivallied energy band structure, materials based upon lead telluride have narrow energy band gaps. Narrow gap semiconductors in general possess non-parabolic energy surfaces and the difficulties encountered in obtaining a satisfactory agreement between theory and experimental data bas been resolved by including non-parabolicity in our theoretical model.

514,239
AD-A148 721/4/GAR PC **A02/MF A01**
University of Wales Inst. of Science and Technology, Cardiff. Dept. of Physics, Electronics, an Electrical Engineering.
Optimisation of the Thermoelectric Figure of Merit in Fine Grained Semiconductor Materials Based upon Lead Telluride.
Periodic rept. no. 4, Sep-Dec 83,
D. M. Rowe, and C. M. Bhandari. Dec 83, 7p
Contract DAJA37-82-C-0116

This report presents the results of calculations of the effect of a multivalley energy band structure on the thermoelectric figure of merit. It is concluded that intervalley scattering significantly reduces the beneficial effect of a multivalley energy band structure. At optimum doping intervalley scattering reduces the ratio by approximately 25%.

514,240
AD-A148 722/2/GAR PC **A02/MF A01**
University of Wales Inst. of Science and Technology, Cardiff. Dept. of Physics, Electronics, an Electrical Engineering.
Optimisation of the Thermoelectric Figure of Merit in Fine Grained Semiconductor Materials Based upon Lead Telluride.
Periodic rept. no. 1, Oct-Dec 82,
D. M. Rowe, and C. M. Bhandari. Dec 82, 8p
Contract DAJA37-82-C-0016

The program of work follows that set out in the initial report and it is proceeding on schedule. A model has been formulated for the lead telluride system and the effect of phonon-grain boundary scattering, doping and alloying on the lattice thermal conductivity of lead telluride investigated. The preliminary results of this work are embodied in the attached paper. The paper entitled The Effect of Phonon-Grain Boundary Scattering, Doping and Alloying on the Lattice Thermal Conductivity of Lead Telluride 'has been submitted for publication in Journal of Physics D. The main conclusion we reach is that in moderately doped materials with a grain size of 1 micrometer, the reduction in lattice thermal conductivity would be in the range 4 to 6 per cent for unalloyed lead telluride and 11 to 13 per cent for highly disorded alloys.

514,241
AD-A148 723/0/GAR PC **A02/MF A01**
University of Wales Inst. of Science and Technology, Cardiff. Dept. of Physics, Electronics, an Electrical Engineering.
Optimisation of the Thermoelectric Figure of Merit in Fine Grained Semiconductor Materials Based upon Lead Telluride.
Periodic rept. no. 3, May-Aug 83,
D. M. Rowe, and C. M. Bhandari. Aug 83, 6p
Contract DAJA37-82-C-0116

The objective of the investigation to date has been to obtain an estimate of the possible relative improvement in material performance due to phonon-grain boundary scattering. The theoretical model employed in the calculations is relatively insensitive to the choice of value taken for parameters such as effective mass and to the nature of the energy surfaces. As indicated in the previous report the immediate task is to develop a more realistic model and work is proceeding towards this objective.

514,242
AD-A148 764/4/GAR PC **A03/MF A01**
Wisconsin Univ.-Milwaukee. Dept. of Physics.
Short Range Order-Long Range Order in Superconducting Materials.
Final scientific rept. 1 Oct 80-30 Sep 84,
M. Levy. 5 Nov 84, 29p
Grant AFOSR-81-0002

Surface waves propagating through NbN films which are columnar in nature and which therefore may behave like inhomogeneous two dimensional superconductors with localized electronic states show attenuation curves which yield an effective superconducting energy gap which saturates at about one third the usual value. A model has been proposed that ascribes this order parameter reduction to the localization of electronic states in the columnar regions. The piezoelectrically induced attenuation curve in a superconducting NbN film is shifted by almost 5 K below the resistivity curve of the film. This shift may be attributed to the resistance in the cores of the Kosterlitz-Thouless vortex-antivortex flux pairs which may exist in an inhomogeneous superconductor. A superconducting granular lead film has been investigated with surface acoustic waves propagating on the piezoelectric substrate. Most of the piezoelectrically induced attenuation in the normal state is quenched when the film becomes superconducting. The residual attenuation that remains in the superconducting state may be related to the fact that the surface acoustic wave samples the sheet resistivity of a small number of granules.

514,243
AD-A148 777/6/GAR PC **A02/MF A01**
Hughes Research Labs., Malibu, CA.
Materials-Process Interactions in Ternary Alloy Semiconductors.
Quarterly rept. no. 5, 1 May-31 Jul 83,
K. V. Vaidyanathan, and J. F. Wager, III . Sep 83, 17p
Contract N00019-82-C-0066

The report describes the properties of InGaAs and the results of detailed x-ray photo-electron and electron energy loss (XPS, ELS) spectroscopies on In0.53 Ga0.47 As samples. The results show that in this alloy system, the native oxide consists of As2O3 and oxides involving In. Oxides involving Ga with other elements are also present.

514,244
DE85000668/GAR PC **A02/MF A01**
Sandia National Labs., Albuquerque, NM.
Susceptibility and Proton NMR Measurements in TiCoH/sub X/.
E. L. Venturini, R. C. Bowman, B. D. Craft, W. E. Tadlock, and J. S. Cantrell. 1984, 15p SAND-84-1856C, CONF-841184-2
Contracts AC04-76DP00053, AC04-76DP00789
Magnetism and magnetic materials conference and exhibit, San Diego, CA, USA, 27 Nov 1984.

The proton spin-lattice relaxation times (T sub 1) and magnetic susceptibilities (X) are used to study the effects of hydrogen on the electronic structure properties of the intermetallic TiCo. Hydrogen addition systematically decreases both X(T) and the proton (T sub 1 T)/sup 1/2/ parameters, which are directly proportional to the local density of the Fermi level electronic states. The behavior for TiCoH/sub x/ is completely opposite to that previously found for several other Ti-based metal hydrides where these parameters tend to

increase with hydrogen content. These differences are attributed to the Fermi levels falling on alternate sides of peaks in the densities of electronic states. The present results for TiCoH/sub x/ are compared with the magnetic properties and the theoretical band structures for the closely related hydride TiFeH/sub x/. (ERA citation 10:000932)

514,245
DE85001221/GAR PC A02/MF A01
Brookhaven National Lab., Upton, NY.
Mode Locking and Chaos in Sliding Charge-Density-Wave Systems.
P. Bak. 1984, 10p BNL-35248, CONF-8409166-1
Contract AC02-76CH00016
International conference on charge density waves in solids, Budapest, Hungary, 3 Sep 1984.

Sliding CDWs in ac electric fields may serve as model systems for the study of mode-locking phenomena and the transition to chaos in dissipative dynamical system with competing frequencies. The mode-locking structure at the transition is expected to form a complete devil's staircase with fractal dimension D approx. 0.87. Indeed, Brown, Mozurkewich and Gruener have observed a multitude of steps in the I-V characteristics of NbSe sub 3 with an apparent fractal dimension D = 0.91 +- 0.03. 16 references. (ERA citation 10:002730)

514,246
DE85002202/GAR PC A02/MF A01
Los Alamos National Lab., NM.
Muon Spin Relaxation in ErRh sub 4 B sub 4.
D. R. Noakes, E. J. Ansaldo, J. H. Brewer, D. R. Harshman, and C. Y. Huang. 1984, 16p LA-UR-84-3159, CONF-841184-3
Contract W-7405-ENG-36
Magnetism and magnetic materials conference and exhibit, San Diego, CA, USA, 27 Nov 1984.

We have found that the erbium magnetic moment is so large that in ErRh sub 4 B sub 4 it can relax muon polarization in times shorter than can be resolved by a typical mu SR apparatus. The complete relaxation signal is resolved at temperatures above 50K only because of rapid fluctuation of the erbium moment, which partially decouples it from the muon's moment. Not much signal is resolved at temperatures less than or equal to 10K, but no dramatic effect is seen in crossing the superconducting transition temperature. The higher temperature local field fluctuation rates observed appear consistent with the exchange and spin-lattice fluctuation rates to be expected of erbium in this material. Perhaps more information on moment dynamics below 10K can be obtained by alloying erbium with a nonmagnetic rare earth such as yttrium within the RERh sub 4 B sub 4 structure (as has been attempted for holmium), to reduce the rms local field at the muon. (ERA citation 10:002733)

514,247
DE85002564/GAR PC A02/MF A01
Oak Ridge National Lab., TN.
Magnetic Excitation in CuMn Spin Glass Alloy.
Y. Tsunoda, N. Kunitomi, and J. W. Cable. Sep 84, 13p CONF-841184-5
Contract AC05-84OR21400
Magnetism and magnetic materials conference and exhibit, San Diego, CA, USA, 27 Nov 1984.

The spin dynamics of a spin glass alloy Cu sub 78.7 Mn sub 21.3 have been studied by neutron inelastic scattering. Measurements have been made at 20 degrees K, 150 degrees K, and 290 degrees K by the constant E mode of operation. Magnetic excitations with rather large energy transfer have been observed around the (1-1/2 0) and the (1-1/2+-delta 0) magnetic diffuse peak positions above and below the spin freezing temperature (T/sub f/ approx. 90 degrees K). The results indicate the existence of strong space and time correlations of the spins over the temperature range of the measurements. The experimental data are well explained by a model of dynamically fluctuating spin clusters with a broad distribution of relaxation times. (ERA citation 10:002597)

514,248
DE85002739/GAR PC A02/MF A01
Argonne National Lab., IL.
Green's Function Solution of the Kondo Problems and Universality of the Thermodynamic Properties.
T. Arai. Sep 84, 25p CONF-841184-4
Contract W-31-109-ENG-38
Magnetism and magnetic materials conference and exhibit, San Diego, CA, USA, 27 Nov 1984.

Portions are illegible in microfiche products.

Using a functional derivative approach, we derive for the nondegenerate Anderson model of dilute magnetic alloys a Green's function, which is valid at all temperature and which accurately exhibits the Kondo effect. This is made possible by explicitly satisfying the Baym criterion for the macroscopic conservation of particle-number, momentum and energy - a criterion not satisfied by any of the earlier Green's function treatment of the Kondo model or the Anderson model. The free energy of the system is calculated and the university of all the thermodynamic properties and the resistivity is analytically demonstrated. The temperature-dependent susceptibility chi(T), specific heat C(T) and resistivity R(T) are calculated and it is found that the universal curves for chi(T) and C(T) are almost indistinguishable from the results of the renormalization group theory. 16 references. (ERA citation 10:003877)

514,249
PB85-136257 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Strain Effects in Superconducting Compounds - An Overview and Synthesis.
Final rept.,
J. W. Ekin. Jul 84, 14p
Pub. in Advances in Cryogenic Engineering 30, p823-836 Jul 84.

An overview of the effect of strain on the critical current, critical field, and critical temperature of A15, B1, and C15 superconductors is presented. Reversible elastic strain effects in many A15 superconductors have been measured, analyzed, and compared in terms of simple strain scaling parameters. In addition, a new critical parameter -- critical strain (epsilon sub c) -- is described and used to characterize the strain sensitivity of these materials. The elastic strain effect is shown to be strongly dependent on crystal structure; it is nonexistent in all superconductors with the B1 and C15 crystal structure tested thus far. Possible mechanisms for explaining the elastic strain effect are briefly described.

514,250
PB85-141471 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Strongly Coupled Non-Neutral Ion Plasma.
Final rept.,
J. J. Bollinger, and D. J. Wineland. 23 Jul 84, 4p
Pub. in Physical Review Letters 53, n4 p348-351, 23 Jul 84.

Radiation pressure from a laser has been used to cool and compress small non-neutral plasmas of (9)Be(+) ions confined by static electric and magnetic fields. A second laser has been used as a probe to measure ion densities of 20 million/cc and ion temperatures below 100 mK. A coupling, gamma, as large as 10 has been obtained indicating that the plasma is strongly coupled. In the future, couplings large enough to observe a liquid-solid phase transition should be accessible.

514,251
PB85-142412 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Surface-Residual-Stress Evaluation Using Horizontally Polarized Shear Waves.
Final rept.,
R. B. King, and C. M. Fortunko. 1 Jun 84, 7p
Pub. in Jnl. of Applied Physics 55, n11 p3978-3983, 1 Jun 84.

In this paper a new theory and experimental method are described for evaluation of surface residual stresses in inhomogeneous, anisotropic materials. The method is based on the use of horizontally polarized shear waves (SH-waves) that propagate at a grazing angle with respect to the surface of a sample. In addition, a new theory is presented for grazing SH-waves propagating through a body in which the stress distribution varies with depth. It is shown that, to first order, the average velocity of the grazing SH-waves is dependent only on the surface values of residual stress. Based on the use of electromagnetic-acoustic transducers (EMATs) to generate and detect grazing SH-waves, preliminary experimental verification of the theory is presented.

514,252
PB85-142537 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Applications of Polarized Electron Sources Utilizing Optical Orientation in Solids.
Final rept.,
D. T. Pierce, and R. J. Celotta. 1984, 6p
Sponsored by Office of Naval Research, Arlington, VA.
Pub. in Optical Orientation, p259-264 1984.

The optical orientation of electron spin in semiconductors provides the basis for the most intense and well controlled source of spin polarized electrons. The method of polarized electron production, the characteristics of the source, and possible ways to increase the polarization are reviewed. Polarized electron sources using optical orientation in GaAs have been applied to a variety of experiments in atomic, condensed matter, and particle physics and a few illustrative examples are presented. A 'perfect' polarized electron-atom scattering experiment is discussed in which the quantum amplitudes and phases which are spin dependent owing to the spin-orbit interaction are determined. Surface magnetism of ferromagnetic solids is investigated by polarized electron scattering, where the spin dependence is due to the exchange interaction; surface hysteresis curves, the deviations of the surface magnetization from the bulk at low temperatures, the critical exponent of the surface magnetization, and spin dependent electronic band structure can be determined. Finally in elementary particle physics, high energy deep inelastic scattering of polarized electrons has given evidence of parity violation attributable to weak neutral currents as predicted in the Weinberg-Salam unified gauge theory.

514,253
PB85-142842 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Solid-Solid Phase Transformations. Where Do We Go from Here.
J. W. Cahn. 1982, 5p
Sponsored by American Society for Metals, Metals Park, OH., Carnegie-Mellon Univ., Pittsburgh, PA., National Science Foundation, Washington, DC., and Metallurgical Society of AIME, Warrendale, PA.
Pub. in Proceedings of International Conference Solid-Solid Phase Transformations, Carnegie-Mellon University, Pittsburgh, PA., August 10-14, 1981, p1588-1590 1982.

The last session of a week-long international conference on phase transformation at Carnegie-Mellon University August 10-14, 1981 was to be a panel discussion entitled 'Where do we go from here.' The panel discussion did not take place, but became six separate discussions. The reports of these sessions together with a summary are published in the conference proceedings. The summary, prepared by J. W. Cahn, discusses the current issues, and the expected impact of new techniques and theoretical developments on the field. The report of one of the discussion sessions, chaired by William C. Johnson, concerns elasticity and plasticity in solid to solid phase transformations.

514,254
PB85-143485 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Crack as a Crystal Defect with Implications for the Fracture Resistance.
Final rept.,
R. M. Thomson, and E. R. Fuller. 1983, 24p
Sponsored by Army Research Office, Arlington, VA., National Science Foundation, Washington, DC., and Office of Naval Research, Washington, DC.
Pub. in Proceedings of International Symposium (3rd) on Fracture Mechanics of Ceramics, University Park, PA, July 15-17, 1981. Paper in Fracture Mechanics of Ceramics, V5, p253-276 1983.

In previous work on a one-dimensional lattice model of a crack, the authors have shown how the discrete nature of bond rupture exhibits energy barriers to brittle crack propagation, and how these barriers resisting thermally activated crack propagation are related to idealized interatomic force laws for a material. The authors have now generalized results to two-dimensional, and to some extent three-dimensional crack configurations. In the paper they demonstrate this generalization, and draw a number of conclusions regarding how real cracks should behave. The authors also are able from their general results, to answer in the negative way an intriguing question, which has appeared at several points in the previous literature, as to whether force laws exist which allow the discrete atomistic barriers to subcritical crack propagation to vanish altogether. Finally, the authors discuss how their general

formalism applies to chemically assisted bond rupture at the crack tip.

514,255
PB85-143998 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Liquid-Solid Transition and the Fractional Quantum Hall Effect.
Final rept.,
P. K. Lam, and S. M. Girvin. 1 Jul 84, 3p
Pub. in Physical Review B: Condensed Matter 30, n1 p473-475, 1 Jul 84.

The critical Landau level filling factor (nu sub c) for the transition from Laughlin's liquid state to a Wigner crystal is determined by comparing the energies of these states. The Wigner crystal energy is substantially improved over the Hartree-Fock result by using a variational wave function which includes particle correlations. The liquid state energy is obtained from the Monte Carlo calculation of Levesque, et al. The authors found (nu sub c) to be slightly larger than 1/7 which is consistent with the experimental observation by Mendez, et al. that the fractional quantum Hall effect does not occur for nu = or < 1/7. The improvement in the crystal energy by correlation is essential to this agreement since without correlations, (nu sub c) is about 1/10. In addition, the crystal correlation energy explains the very low temperatures required to see the nu = 1/5 liquid state.

514,256
PB85-144012 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Anomalous Quantum Hall Effect and Two-Dimensional Plasmas: Analytic Approximations for Correlation Functions and Ground State Energies.
Final rept.,
S. M. Girvin. 15 Jul 84, 3p
Pub. in Physical Review B: Condensed Matter 30, n2 p558-560, 15 Jul 84.

A simple analytic scheme is presented for the estimation of the two-point correlation function and the ground state energy of a class of variational wave functions of interest in the study of the anomalous quantum Hall effect. The technique is illustrated by application to the wave function recently proposed by Laughlin and to a generalization of this wave function developed by Chui and Ma. The technique also yields information about the classical two-dimensional plasma problems associated with these wave functions.

514,257
PB85-144442 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Fast Ion Transport in the NASICON Analog Na3Sc2(PO4)3: Structure and Conductivity.
Final rept.,
S. Susman, C. J. Delbecq, T. O. Brun, and E. Prince. Dec 83, 6p
Pub. in Solid State Ionics, v9-10 pt2 p839-844 Dec 83.

The room temperature modification of stoichiometric NASICON(Sc) is monoclinic Cc. At 64C there is a first order transition to a normal-conducting rhombohedral form R(bar 3)c. Na(1) sites are fully occupied whereas Na(2) sites are partially occupied. At 167C there is a transition to a superionic phase, but the structure remains rhombohedral R(bar 3)c. Vacancies are now shared equally by Na(1) and Na(2) sites. Fast Na-ion motion in stoichiometric Na3Sc2(PO4)3 arises from vacancy motion in a 'dogleg' path between Na(1) and Na(2) sites.

514,258
PB85-144970 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Temperature Dependence of the Quantum Hall Resistance.
Final rept.,
M. E. Cage, B. F. Field, R. F. Dziuba, S. M. Girvin, and A. C. Gossard. 15 Aug 84, 3p
Pub. in Physical Review B 30, n4 p2286-2288, 15 Aug 84.

The authors report high precision measurements of the temperature dependence of the quantum Hall resistance for two GaAs heterostructures. The Hall resistivity (rho sub xy)(T) is found to vary linearly with the minimum resistivity along the device (rho sub xx, sup min)(T) and to depend upon the sample, Hall probe set, and magnetic field direction, but to approach a sample-independent value as T approaches 0. The temperature dependent shift of (rho sub xy)(T) from (rho sub xy)(0) can be significant even for very flat Hall steps and is inconsistent with standard mechanisms.

514,259
PB85-147916 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Determination of the Superconductive Transition Temperatures of Cd, Zn, and Al Using a Josephson Junction Noise Thermometer.
Final rept.,
W. E. Fogle, J. H. Colwell, and R. J. Soulen. 1984, 2p
Pub. in Proceedings of International Conference on Low Temperature Physics (17th), Karlsruhe, Germany, August 15-22, 1984, p1149-1150.

In order to evaluate the accuracy of the EPT-76 temperature scale, the authors measured three fixed points defined on that scale (the superconductive transition temperatures of Cd, Zn, and Al) using a Josephson junction noise thermometer.

20M. Thermodynamics

514,260
DE85000155/GAR PC **A02/MF A01**
Oak Ridge National Lab., TN.
Formulation of a Hyperbolic Stefan Problem.
A. D. Solomon, V. Alexiades, D. G. Wilson, and J. Drake. Oct 84, 24p ORNL-6065
Contract AC05-84OR21400

The study of phase change processes governed by hyperbolic heat transfer is at an embryonic stage. We raise here some of the relevant questions and make some remarks on the formulation and qualitative behavior of a hyperbolic Stefan problem. In particular, we correct an error in the interface condition appearing in the literature, present an explicit solution to a simple one-phase problem and study its behavior. Finally we describe an enthalpy (weak) formulation for a two-phase problem and report on a number of numerical experiments based on it. (ERA citation 10:001549)

514,261
DE85000965/GAR PC **A02/MF A01**
Union Carbide Corp., Oak Ridge, TN. Nuclear Div.
Some Aspects of the Computer Simulation of Conduction Heat Transfer and Phase Change Processes.
A. D. Solomon. 18 Dec 81, 16p CONF-8112111-1-Dr
Contract AC05-84OR21400
International conference on computing methods in applied sciences and engineering, Versailles, France, 14 Dec 1981.
Portions are illegible in microfiche products.

Various aspects are discussed of phase change processes in materials including computer modeling, validation of results and sensitivity. In addition, the possible incorporation of cognitive activities in computational heat transfer is examined. (ERA citation 10:003015)

514,262
N85-12851/4/GAR PC **A04/MF A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Festkoerperforschung.
Exotherme Prozesse in Festkoerpern bei Tiefen Temperaturen, Ihre Physik und Ihre Kryotechnischen Implikation (Exothermic Processes in Solids under Low Temperatures, Their Physics and Their Cryogenic Implications).
Thesis - Cologne Univ.
M. Schwark. May 84, 62p JUEL-1919, D-38
Text in German.

Heat output of materials used for cryogenic equipment was studied at temperatures of 30 to 60 mK. Hydrogen in copper shows orthoparaconversion, releasing an equivalent of 0.1 nW/gr copper within 10 hr of sample cooling. For plastics (Stycast 2850) values are up to 0.2 nW/gr. In quartz, NbTixDy and NbTixHy (x y) tunnel processes occur up to 100 hr after cooling. The theory of Anderson, Halperin and Varma is applicable in longer periods. Plastics as well as hydrogen in copper parts are serious sources for thermal leaks.

514,263
PB85-135531 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Status of Thermophysical Properties Data for Pure Fluids and Mixtures of Cryogenic Interest.
Final rept.,
W. M. Haynes, A. J. Kidnay, N. A. Olien, and M. J. Hiza. 1984, 32p
Pub. in Advances in Cryogenic Engineering 27, p919-942 1984.

This paper will discuss the importance of accurate thermophysical properties data for pure fluids and fluid mixtures encountered in cryogenic process technology. The most important properties will be identified, the status of data for these properties will be summarized, and recommendations for future work will be proposed. The integrated roles of experiment, basic theory, and correlation techniques in obtaining a fundamental understanding of fluid behavior for the development of techniques for the prediction of thermophysical properties will be discussed.

514,264
PB85-147932 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Superconductive Temperature Reference Points above 0.5 K.
Final rept.,
J. F. Schooley, and J. H. Colwell. 1984, 2p
Pub. in Proceedings of International Conference on Low Temperature Physics (17th), Karlsruhe, Germany, August 15-22, 1984, p409-410.

Careful preparation and annealing of samples made from high-purity Pb, In, Al, Zn, and Cd have resulted in sample-to-sample (T sub c) variations of less than 0.5 mK. Less-pure Nb samples, while more variable in Tc, still exhibit single-sample reproducibilities better than 0.2 mK. Temperature reference devices incorporating these six elements offer stable, high precision in situ calibration capability.

21.

PROPULSION AND FUELS

21B. Combustion and Ignition

514,265
AD-A148 758/6/GAR PC **A06/MF A01**
Exxon Research and Engineering Co., Linden, NJ. Corporate Research-Technology Feasibility Center.
Radiation/Catalytic Augmented Combustion.
Final scientific rept. 1 Apr 81-31 Mar 83,
A. E. Cerkanowicz, and I. D. Crane. May 84, 108p
AFOSR-TR-84-1129
Contract F49620-81-C-0028

Two novel concepts for extending aircraft operational range have been researched under this contract. They are radiative and catalytic augmentation techniques. The feasibility of utilizing these techniques to alter (augment) combustion initiation and reaction kinetics which restrict combustor operation via limits on flammability, flame propagation, ignition and stability has been investigated. Both techniques have demonstrated the potential to improve combustion processes. The radiative technique under laboratory static conditions has successfully ignited fuel-air mixtures, and has enhanced combustion processes, utilizing pulsed and continuous vacuum ultraviolet light sources. Similarly, the catalytic technique has broadened stability limits under normally difficult fuel lean, low temperature conditions. Complementary efforts have focused on the developement of analytical capabilities required for modeling the radiative and catalytic techniques. (Author)

514,266

AD-A148 801/4/GAR PC A03/MF A01
United Technologies Research Center, East Hartford, CT.
CARS Temperature Measurements in Sooting, Laminar Diffusion Flames.
Progress rept. 1 Jan 81-30 Jul 84,
L. R. Boedeker, and G. M. Dobbs. 30 Jul 84, 33p
Rept no. TR-1
Contract N00014-81-C-0046

Temperature distributions have been measured in axisymmetric ethylene-air diffusion flames using high spatial resolution coherent anti-Stokes Raman spectroscopy. As ethylene flow increased and the flame approached a smoke-point condition, the temperatures attained in the upper part of the flame were reduced by about 300K below the maximum radial temperatures low in the flame. Addition of diluent N2 to ethylene caused a reduction in temperature low in the flame but increased temperature higher in the flame. Maximum temperatures attained in all ethylene flames were between 0.84 and 0.89 of respective adiabatic flame temperatures (AFT). The upper temperature of the near-smoke-point flame was only 0.76 of AFT. Results are compared with the generalized flame front model of Mitchell. MIE scattering measurements are also discussed. Brief studies with propane and a nonsooting, CO flame are reported; maximum axial and radial temperatures were between 0.84 and 0.87 of AFT. Results indicate the importance of thermal loss from soot radiation, radial transport processes and fuel pyrolysis. Nonluminous radiation and finite reaction rates are other possible factors. The upper luminous part of the highly sooting ethylene flame is likely above the primary flame front and is a soot burnout zone.

514,267

AD-A143 802/2/GAR PC A02/MF A01
California Univ., Berkeley. Dept. of Mechanical Engineering.
Flame Propagation and Stabilization Studies Using Rayleigh Scattering and Laser Doppler Velocimetry.
Final rept. 2 May 82-1 May 84,
L. Talbot, and F. Robben. 15 Jun 84, 7p AFOSR-TR-84-1128
Contract F49620-80-c-0065

Studies of premixed turbulent flame propagation have been carried out using laser tomography, two-point Rayleigh scattering, and combined Rayleigh-LDV single point measurements. Probability density functions of intermediate states, correlation coefficients and correlation length scales within the reaction zone have been measured. A theoretical model has been developed which predicts these quantities, and very good agreement between theory and experiment is obtained.

514,268

PB85-141406 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Burning Behavior of Upholstered Furniture Mockups.
Final rept.,
J. F. Krasny, and V. Babrauskas. Jun 84, 31p
Pub. in Jnl. of Fire Sciences 2, p205-235 May-Jun 84.

Furniture mockups consisting of various arrangements of full-size cushions were tested in the NBS furniture calorimeter. Measurements included heat release, combustion product concentrations, and flame spread characteristics. Major variations in burning were observed: neoprene mockups only smoldered; flame retardant treated polyurethane mockups burned more slowly than untreated mockups but eventually reached similar maximum heat release rates. Fabrics ranked, in terms of maximum heat release rate and several other measured characteristics, from low to high; heavy cotton fabric; light cotton and heavy olefin; and light olefin. Flame spread rate measured on the mockups correlated with time to 100 kW heat release rate. Heat release rate and combustion product concentration generally increased with increasing number of cushions per mockup. Thinner cushions burned more rapidly than thicker ones.

514,269

PB85-143493 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Collection of Ions Produced by Continuous Wave Laser-Enhanced Ionization in a Hydrogen-Air Flame.
Final rept.,
P. K. Schenck, J. C. Travis, G. C. Turk, and T. C. O'Haver. 1981, 11p
Pub in Jnl. of Physical Chemistry 85, n17 p2547-2557 1981.

Laser enhanced ionization (LEI) -- or the optogalvanic effect in flames -- is known to result when a tunable laser is used to significantly populate an excited state of an atomic species in an atmospheric pressure flame. The perturbed ionization rate may be sensed with external electrodes, providing the opportunity for applications to trace metal analysis and combustion research. The present study correlates experimental studies of the spatial and temporal characteristics of the LEI signal with theoretical expectations. The experiments are performed with a cw dye laser exciting the D2 transition of sodium introduced in to H2/air flame. Saturation currents with and without laser excitation are found to be consistent with expected ionization rate constants for the Na ground and excited states. Vertical spatial profiles -- using a unique imaging method -- show the physical size of the excess ion region generated by the laser, and the influence of external voltage, flame velocity, diffusion, and coulombic expansion on the excess ion region. Rise and fall times -- measured at different voltages with the laser switched by an acousto-optic modulator -- show the dependence on ion mobility, electric field, and excited state ionization rate constant. The relationships derived and illustrated would be of value for the improvement of precision and accuracy in analytical and diagnostic LEI.

21D. Fuels

514,270

DE85002692/GAR PC A05/MF A01
National Research Council, Washington, DC. Energy Engineering Board.
Stimulating Cooperative Research in Fossil Energy at Universities.
1984, 84p DOE/FE/60367-T1
Contract AC01-83FE60367
Portions are illegible in microfiche products.

The US Department of Energy (DOE), through its Office of Fossil Energy (OFE), supports basic and long-term research in fossil fuels at government, university, industry, and other laboratories. This research aims to increase the general scientific and technological knowledge base as well as to foster the engineering advances that help meet the nation's requirements for energy. There has been an increased interest recently in closer relations between the federal government, universities, and industry to promote cooperative research. University scientists and engineers need to find alternative sources of stable, multiyear funding. Long-term support is essential to attract graduate students for research - students and faculty members need assurance that their funds will not disappear midway through a research project. The Office of Fossil Energy is interested in cooperative research as a way of leveraging its funds in order to build or maintain a critical mass of university researchers in fossil energy areas and to increase the relevance to industry of the university research that it sponsors. Clearly, all three parties can benefit from cooperative research. There are also debits associated with industry and government involvement in university research, which are described. (ERA citation 10:004120)

514,271

N85-12183/8/GAR PC A02/MF A01
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Lubricity of Well-Characterized Jet and Broad-Cut Fuels by Ball-on-Cylinder Machine.
G. M. Prok, and W. S. Kim. Nov 84, 15p NAS 1.15:83807, E-2308, NASA-TM-83807

A ball-on-cylinder machine (BOCM) was used to measure the lubricity of fuels. The fuels tested were well-characterized fuels available from other programs at the NASA Lewis Research Center plus some in-house mildly hydroprocessed shale fuels from other programs included Jet-A, ERBS fuel, ERBS blends, and blend stock. The BOCM tests were made before and after clay treatment of some of these fuels with both humidified air and dry nitrogen as the preconditioning and cover gas. As expected, clay treatment always reduced fuel lubricity. Using nitrogen preconditioning and cover gas always resulted in a smaller wear scar diameter than when humidified air was used. Also observed was an indication of lower lubricity with lower boiling range fuels and lower aromatic fuels. Gas chromatographic analysis indicted changes in BOCM-stressed fuels.

514,272

PB85-136745/GAR PC A07/MF A01
Battelle Pacific Northwest Labs., Richland, WA.
Assessment of Large Scale Biomass Gasification Systems for Less Developed Countries.
E. G. Baker, D. H. Mitchell, and J. F. Williford. Sep 80, 126p AID-PN-AAL-767
Contract USDA-23-11-104-72, Grant PASA-AG(STR)-4709-6-79

This state-of-the-art report evaluates large-scale biomass gasification systems both economically and technically and analyses their potential applications in developing countries. After a discussion of biomass feedstock types, handling, and preparation, the authors describe various types of gasifiers available (fixed bed updraft and downdraft, fluid bed, and entrained bed) and their current applications. Gasification chemistry, advanced gasification systems, and gas cleaning are also considered. Next, the use of fuel gas from biomass for steam power production, other fired equipment, internal combustion engines for power production, gas turbine cycles, synthesis of methanol and other liquid fuels, and synthesis of ammonia and other chemicals, is discussed. The environmental impacts of biomass gasification are reviewed. The authors conclude that availability of sufficient feed materials is essential for large-scale biomass gasification in developing countries. The most promising applications are: (1) rural electrification using air-blown biomass gasifiers and diesel generators; (2) retrofitting existing oil and gas fired equipment in various industries, particularly in agricultural processing plants; and (3) producing ammonia-based fertilizers from biomass-derived synthesis gas.

514,273

PB85-138063/GAR PC A17/MF A01
Kentucky Univ., Lexington. Inst. for Mining and Minerals Research.
Proceedings: Eastern Oil Shale Symposium Held at Lexington, Kentucky on October 11-13, 1982,
R. Pettit. c1983, 378p IMMR82-075, ISBN-0-86607-013-3
Sponsored by Kentucky Energy Cabinet, Lexington.

This report deals with the proceedings of the 1982 Eastern Oil Shale Symposium. The subjects of the discussions were: Oil Shale Geology and Geochemistry, Analytical Characterization of Oil Shale/Shale Oil, Process Technology, Environmental Studies and Mining and Reclamation Technology.

514,274

PB85-140184/GAR PC A11/MF A01
Chatterjee (Anil K.), Newark, CA.
State of the Art Report on Pyrolysis of Wood and Agricultural Biomass.
A. K. Chatterjee. Mar 81, 249p AID-PN-AAK-818
Contract USDA/FS-53-319R-0-206, Grant PASA-AG(STR)-4709-6-79

Pyrolysis of agricultural and forestry biomass, which yields clean-burning, high-energy fuels such as charcoal, pyrolytic oil, and fuel gas, provides energy-poor developing countries the most appropriate technology for using alternative energy resources. So concludes this state-of-the-art review, based on a literature search, of biomass pyrolysis. The author defines the thermochemical conversion theory and basic pyrolysis processes and provides descriptions of typical and specific processes; lists potential and available biomass resources, along with the biomass properties relevant to pyrolytic conversion; and discusses the collection, storage, and preprocessing of biomass feedstock, as well as the recovery of the converted products. Case studies of pyrolysis activities in developing and developed countries are presented, along with an economic analysis of a biomass pyrolysis conversion facility and a brief discussion of the environmental effects of the conversion process. Recommendations for countries seeking to employ biomass pyrolysis conclude the study. Appended are a list of resource per-

sons and institutions and a 53-item bibliography (1961-81).

514,275
PB85-143584 Not available NTIS
National Bureau of Standards, Gaithersburg, MD.
Ignition of a Liquid Fuel Under High Intensity Radiation.
Final rept.,
T. Kashiwagi. 1980, 9p
Pub. in Combustion Science and Technology 21, n3-4 p131-139 1980.

This describes an experimental study of the key process of the ignition. First, the effect of the container size on ignition was studied to determine the appropriate container size to avoid wall effects. Then, high speed photographs were taken to observe the events through the preheating period to ignition. Finally the effect on ignition of the incident angle of the laser beam with respect to the liquid surface was studied. Results obtained from these experiments are described.

514,276
PB85-147718/GAR PC **A09**/MF **A01**
Bonner and Moore Management Science, Houston, TX.
Natural Gas Consumption in U.S. Refineries.
Final rept. Mar-Sep 84,
F. P. Frederick. Sep 84, 176p GRI-84/0143
Contract GRI-5083-800-0909

The U.S. refining industry utilizes various types of energy in the manufacture of petroleum products from crude oil. Natural gas has been preferentially utilized for some manufacturing processes. With changes in the energy industry (pricing of fuels, introduction of new technology and alteration in government policies and fuels availability, the demand for natural gas as a refinery fuel has also changed. This report analyzes changes which have occurred and projects the demand for natural gas to the year 2000. The analysis places the demand forecast in regional perspective by using data from various Petroleum Administration for Defense Districts (PADDs) which were used as geographical units for gas demand analysis/reporting.

514,277
PB85-148468/GAR PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Chemical Engineering.
Mechanisms of Heat and Mass Transfer Across a Double-Diffusive Interface.
Final rept. Sep 78-Aug 84,
B. H. Ko, and K. A. Smith. Jun 84, 45p GRI-84/0177
Contract GRI-5014-353-0160

Flux measurements in an aqueous two-layer double-diffusive system using heat and NaCl confirmed the existence of a regime in which the ratio of the buoyancy fluxes (BFR) of salt and heat is independent of the stability ratio (R = beta(delta C)/alpha(delta T)). Linear analysis showed that the quiescent system can become unstable to small perturbations even when the lower layer is denser than the upper. If R is large, the most unstable mode presents as an oscillatory, antisymmetric pattern.

514,278
PB85-149755/GAR PC **A03**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Thermal Radiation from LNG (Liquid Natural Gas) Trench Fires. Volume 3. Movie Script.
Final rept. Sep 82-Sep 84,
P. A. Croce. c1984, 33p ADL-REF-88682-F, GRI-84/0151.3
Contract GRI-5082-252-0719
See also PB85-129096. Prepared in cooperation with Urbanimage Corp., Boston, MA.

The current federal regulations for LNG facilities require a thermal radiation exclusion zone for public safety around spill impoundment systems. The size of this zone is determined by applying a thermal radiation model that was developed for large circular or near circular pool fires. Since trench (elongated pool) fires behave differently from circular pool fires, an experimental test program was conducted to monitor the fire behavior and thermal radiation from large-scale LNG trench fires. This volume presents the text of the script and the still graphics used in producing a documentary film covering the project activities and results for an audience consisting primarily of gas industry representatives and government regulators.

514,279
PB85-149797/GAR PC **A04**/MF **A01**
North Carolina Univ., Chapel Hill.
Reduction of CO2.
Annual rept. Jul 83-Jul 84,
B. P. Sullivan, and T. J. Meyer. Aug 84, 52p GRI-84/0175
Contract GRI-5083-260-0827
See also PB84-214360.

The report describes a variety of new strategies for the electrocatalytic and stoichiometric reduction of CO2 to either CO or formate ion. The first sections concentrate on the design of electrocatalysts derived from polypyridyl complexes of Rh, Ir, Ru and Re and delineates, as far as is known to date, mechanistic information which controls their catalytic behavior. The latter sections of the report are primarily devoted to the thermal and photochemical reduction of CO2 and related small molecules using bipyridyl-Re(sup 1) complexes. Synthetic and mechanistic studies are presented which highlight the microscopic processes responsible for the formal insertion of CO2 into the Re(sup 1)-H bond to yield a thermally stable Re(sup 1)-formate complex. The photochemically driven analogue of this reaction is also discussed. Finally, a short section on the mechanism of oxidation of formate ion to CO2 by oxo-complexes of ruthenium is presented.

514,280
PB85-149805/GAR PC **A09**/MF **A01**
Energy and Environmental Analysis, Inc., Arlington, VA.
Factors Affecting the Competitive Position of Natural Gas in Industrial Heat Applications.
Topical rept. Mar 83-Sep 84,
T. M. Desai, S. Y. Salama, K. G. Duleep, B. Venkateshwara, and P. H. Forshay. Sep 84, 178p GRI-84/0187
Contract GRI-5082-512-0622

Gas use in industrial process heat market is expected to face increased competition from technologies based on alternate energy sources. The diversity in process heat applications makes it necessary to examine industrial process heating at a disaggregated level to assess the competition faced by gas technologies and to explore R&D concepts to improve gas competitiveness. Thirty-eight subcategories have been developed, each with common technology competition issues. The energy and natural gas consumptions in each of these subcategories are estimated. The competition faced by gas technologies from electric and coal technologies is assessed and each subcategory is classified as safe, uncertain, or vulnerable based on the degree of competition. The natural gas consumption for process heat is divided between the three classifications as follows: 41 percent as safe, 26 percent as uncertain, and 33 percent as vulnerable. Issues affecting the selection of gas versus oil and trends influencing gas consumption are addressed whenever relevant.

514,281
PB85-149821/GAR PC **A04**/MF **A01**
Brookhaven National Lab., Upton, NY.
Development of Polymer Concrete for Dike Insulation at LNG (Liquid Natural Gas) Facilities.
Final rept. Aug 83-Jul 84,
J. J. Fontana, and M. Steinberg. Nov 84, 51p GRI-84/0193
Contract GRI-5083-252-0812
Prepared in cooperation with Associated Universities, Inc., New York.

An insulating polymer concrete (IPC) composite has been developed for possible use as a dike insulation material at Liquid Natural Gas (LNG) storage facilities. Using hermetically sealed glass nodules or expanded perlite aggregates and unsaturated polyester resins, a new class of lightweight polymer concretes can be manufactured. Two application procedures have been identified and shown to be feasible in laboratory studies. Precast IPC composite panels 1-in thick can be bonded to concrete substrates using epoxy gel type adhesives or mortars. Cast-in-place IPC to concrete substrates have been shown to have good bonding and insulating characteristics. Modifications of the mix design to improve the workability and sagging of the IPC for installation on vertical or sloped surfaces is necessary.

514,282
PB85-149839/GAR PC **A04**/MF **A01**
Southern Illinois Univ. at Carbondale.
Photoacoustic Microscopy of Coal Macerals.
Final rept. Jan 82-Aug 84,
K. W. Johnson, K. L. Telschow, and J. C. Crelling. Sep 84, 59p GRI-84/0199
Contract GRI-5082-260-0617
See also PB84-179183.

The overall objective of the project was to develop photoacoustic microscopy as a new, in situ technique for delineating the thermal properties of coal macerals. This petrographic information is expected to play a role in the characterization of coal for any process where the properties of the coal determine the behavior of the process. To characterize coal properly, both its chemical composition and its thermal properties must be known. Photoacoustic microscopy offers a useful technique for probing the thermal-conductance and thermal-elastic properties of coal macerals. Coupled with the traditional reflectance measurements, which yield information about the optical properties of macerals, photoacoustic microscopy can be used to produce a more comprehensive classification of the properties of macerals. The major result achieved has been the development of a photoacoustic/reflectance microscope capable of obtaining thermal and optical data from the same coal macerals. The data on Appalachian-basin coals shows that their thermal properties vary considerably with rank, from Hi-Vol C bituminous to anthracite. These changes in thermal properties with rank have been explained using known properties of coal. In addition, there are significant differences between the thermal properties of vitrinite and pseudovitrinite macerals. The differences are especially prominent for low rank coals, such as Hi-Vol C, and gradually disappear in the higher rank coals beginning with semi-anthracite.

514,283
PB85-854461/GAR PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Coal Conversion Processes: Flash Hydropyrolysis Process. 1976-January 1985 (Citations from the Energy Data Base).
Rept. for 1976-Jan 85.
Jan 85, 203p
Supersedes PB84-858208. Prepared in cooperation with Department of Energy, Washington, DC.

This bibliography contains citations concerning government and private sector supported research, development, and implementation of the flash hydropyrolysis coal conversion process. Topics include process experimentation, development, operation, performance, and products as well as technological, environmental, and economic aspects of the flash hydropyrolysis process. (This updated bibliography contains 200 citations, 31 of which are new entries to the previous edition.)

514,284
PB85-900600/GAR Subscription
Department of Energy, Oak Ridge, TN. Technical Information Div.
Energy from Biomass.
Semimonthly repts.
1985, 24 issues
Paper copy available on subscription, North American Continent price $40.00/year; all others write for quote. Single copies also available.

Energy Biomass issues on a semimonthly basis the current worldwide information available on all aspects of biomass production, conversion, and utilization for energy. Information on the following subjects is included within the scope of this publication, but all subjects may not appear in each issue: Hydrogen production, Hydrocarbon Fuels from Wastes or Biomass, Alcohol Fuels from Wastes or Biomass, Solid Waste and Wood Fuels, Liquid Waste Fuels, Gaseous Waste Fuels, Biomass Production, Photochemical and Photobiological Conversions, and Energy Planning and Policy. The digests in this bulletin and other Citations to information on the use of biomass and wastes for the production of energy are available for on-line searching and retrieval in the Energy Data Base.

21E. Jet and Gas Turbine Engines

514,285
AD-A148 708/1/GAR PC A10/MF A01
Naval Postgraduate School, Monterey, CA.
Analytic Model of Gas Turbine Engine Installations.
Master's thesis,
S. M. Ezzell. Sep 84, 225p

An interactive computer simulation of marine gas turbine installations including intake and exhaust ducting for the engine and module cooling has been developed. A one-dimensional analysis was used in determining the pressure losses of the ducting. The pressure losses along with the ambient conditions and desired power setting define a unique operating point for the system. The computer model predicts operating parameters for this point by an iterative matching technique.

514,286
AD-A148 757/8/GAR PC A07/MF A01
Southwest Research Inst., San Antonio, TX.
Exploratory Development of Advanced Surface Flaw Detection Methods.
Final rept. 1 Jun 82-31 Oct 84,
R. E. Beissner, G. L. Burkhardt, and F. N. Kusenberger. Sep 84, 139p SWRI-15-7106, AFWAL-TR-84-4121
Contract F33615-82-C-5020

Development of the electric current perturbation (ECP) method for application to surface flaw detection in the retirement-for-cause (RFC) inspection system is described. Physical constraints imposed by material properties and complex geometrical features of F100 engine parts are discussed as background for the selection and preparation of specimens for experimental optimization of ECP probe design. Experimental flaw detection data are presented for simple laboratory specimens, specimens designed to simulate complex geometry features of concern in F100 engine inspection, and finally, for actual engine parts. Results demonstrate that the detection of flaws even smaller than 0.010 in. long by 0.005 in. deep is possible in blade slots. Also, from experimental data obtained in blade slot scans, preliminary estimates of the probability of detection as a function of flaw size are provided. Based on data reported here, it is concluded that ECP method has been demonstrated with the breadboard system to have the inherent sensitivity and repeatability to meet RFC requirements regarding flaw detection capability and system compatibility, and is now ready for more extensive evaluation in an actual inspection environment.

514,287
AD-P004 215/0/GAR PC A02/MF A01
General Electric Co., Cincinnati, OH.
Gas Turbine Engine Design Considerations as Related to Alloys of High Critical Element Content,
R. A. Sprague. Apr 84, 6p
This article is from the Proceedings of the Meeting of the Structures and Materials Panel (57th) Held at Vimeiro, Portugal on 14-19 Oct 83, AD-A148 598, p5-1 - 5-6.

The primary payoff in selection of wrought/cast alloys containing strategic elements is performance, not cost. For example, in commercial engines, the temperatures that parts are exposed to have increased steadily in an effort to improve specific fuel consumption. In military engines, higher operating temperatures are usually governed by efforts to improve thrust to weight ratio. This paper will review the trade-offs that a designer must make in the selection of materials for specific component applications. Emphasis will be placed on discussion of what options are available in reducing the strategic material content of the engine system while still achieving performance and cost objectives. (Author)

514,288
N85-12059/0/GAR PC A03/MF A01
General Electric Co., Cincinnati, OH.
Materials for Advanced Turbine Engines. Project 2: Rene 150 Directionally Solidified Superalloy Turbine Blades, Volume 2.
Final Report.
G. J. Deboer. Feb 82, 39p NAS 1.26:167993, R82AEB540-V-2, NASA-CR-167993
Contract NAS3-20074

The results of the engine testing of Rene 150 Stage 1 high pressure turbine blades in CF6-50 core and fan engines are presented. The core engine test was conducted for 233 hours with a variety of test cycles, and the fan engine test was conducted for 1000 C cycles. Post-test analysis of the core engine test data confirmed the suitability of the Rene 150 HPT blade for fan engine testing. Post-test evaluation and analysis of the fan engine test blades included visual and dimensional inspection as well as metallographic examination of selected blades. The Rene 150 HPT blade met the target goal of this project by demonstrating increased metal temperature capability; however, the post-test analysis revealed several areas that would have to be addressed in designing a long-life Rene 150 CF6-50 HPT blade.

514,289
N85-12315/8/GAR PC A08/MF A01
Texas A and M Univ., College Station.
Heat Transfer and Pressure Drop in Blade Cooling Channels with Turbulence Promoters.
Final Report.
J. C. Han, J. S. Park, and C. K. Lei. Nov 84, 156p
NAS 1.26:3837, E-2249, NASA-CR-3837
Contract DA PROJ. 1L1-62209-AH-76

Repeated rib roughness elements have been used in advanced turbine cooling designs to enhance the internal heat transfer. Often the ribs are perpendicular to the main flow direction so that they have an angle-of-attack of 90 deg. The objective of the project was to investigate the effect of rib angle-of-attack on the pressure drop and the average heat transfer coefficients in a square duct with two opposite rib-roughned walls for Reynolds number varied from 8000 to 80,000. The rib height-to-equivalent diameter ratio (e/D) was kept at a constant value of 0.063, the rib pitch-to-height ratio (P/e) was varied from 10 to 20, and the rib angle-of-attack (alpha) was varied from 90 deg to 60 deg to 45 deg to 30 deg respectively. Two types of entrance conditions were examined, namely, long duct and sudden contraction. The heat transfer coefficient distribution on the smooth side wall and the rough side wall at the entrance and the fully developed regions were measured. Thermal performance comparison indicated that the pumping power requirement for the rib with an oblique angle to the flow (alpha = 45 deg to 30 deg) was about 20 to 50 percent lower than the rib with a 90 deg angle to the flow for a given heat transfer duty.

514,290
N85-12687/8/GAR PC A02/MF A01
Rolls-Royce Ltd., Derby (England).
Applications of Fibre Optics in Gas Turbine Engine Instrumentation.
I. Davidson. 3 May 84, 12p PNR-90209

Fiber optic instrumentation in aircraft engines is reviewed. Data transmission, endoscopy, flame detection, radiation pyrometry, laser anemometry, blade tip clearance sensors, and pinhole cameras are described.

21G. Reciprocating Engines

514,291
N85-12808/0/GAR PC A09/MF A01
Mechanical Technology, Inc., Latham, NY.
Development of Gas-Lubricated Pistons for Heavy Duty Diesel Engine Technology Program.
Final Report.
W. Shapiro. Jul 84, 192p NAS 1.26:174746, MTI-84TR58, NASA-CR-174746
Contracts DEN3-309, DE-AI01-80CS-50194

Static testing of a segmented, gas-lubricated, piston-ring was accomplished. The ring utilizes high-pressure gas generated during the diesel cycle to energize a hydrostatic gas film between the piston and cylinder liner. The configuration was deficient in overall performance, because all segments of a ring set failed to form a fluid-film simultaneously, when exposed to internal preload. The difficulty was traced to the moment balance required to prevent the segments from overturning and contacting the cylinder walls. Some individual sectors formed a film and performed well in every respect including load capability to 6,000 N. These results produce optimism as to the ultimate feasibility of hydrostatic, gas-lubricated piston rings. In addition to test results, the principles of operation, and theoretical developments are presented. Breathable liner concepts are suggested for future consideration. In these configurations, solid hydrostatic pistons are coupled with flexible liners that elastically deform to form a gas-film under hydrostatic pressurization. Breathable liners afford the mechanical simplicity required for mass produced engines, and initial examination indicates satisfactory operation.

514,292
PB85-136075/GAR
(Order as PB85-136042/GAR, PC E05/MF E01)
Mitsubishi Electric Corp., Tokyo (Japan).
Electronic Control System for Carburetors,
M. Miyazaki, M. Ishii, H. Kako, and K. Ikebuchi.
c1984, 4p
Text in Japanese.
Included in Mitsubishi Denki Giho, v58 n10 p16-19 1984.

Electronic control systems were introduced in response to the interrelated demands for purifying exhaust gases, fuel efficiency and improved drivability. Mitsubishi Electric has developed, in cooperation with Mitsubishi Motors Corporation and Mikuni Industries, a low-cost electronic control system for carburetors with excellent controllability of the air-to-fuel ratio. The article introduces this carburetor control system and the computer unit.

21H. Rocket Motors and Engines

514,293
AD-A148 818/8/GAR PC A10/MF A01
Air Force Office of Scientific Research, Bolling AFB, DC.
AFOSR/AFRPL Rocket Propulsion Research Meeting Held at Lancaster, California on 12-15 March 1984. Abstracts and Agenda.
Interim rept. Mar 83-Feb 84,
L. H. Caveny, and R. A. Biggers. Feb 84, 202p Rept no. AFOSR-TR-84-1114

This document contains expanded abstracts from the Air Force basic research program on rocket propulsion. The document contains the agenda for the Rocket Research Meeting held at Lancaster, CA on 12-15 March 1984. Major topics include: energetic material combustion, metal combustion, diagnostics of reacting flow, chemical kinetics, thermal properties, synthesis of new ingredients, combustion stability, acoustic interaction, plumes, beamed energy, solar propulsion, and electrical propulsion. (Author).

514,294
N85-12087/1/GAR PC A03/MF A01
National Aerospace Lab., Tokyo (Japan).
Experiments on Residual Thrust and Prediction for Upper-Stage Solid Propellant Rockets.
T. Mitani, M. Takahashi, T. Niioka, K. Kusaka, and T. Kumagai. Mar 84, 26p NAL-TR-800
In Japanese; English Summary.

Subscale rocket motors of 150 mm (cylindrical) in dia. and 380 mm (spherical) in dia. were tested to investigate the small residual thrust of solid propellant rockets. The residual chamber pressure was measured by using pressure gages with full ranges of 2.5 and 5 psia (0.334 and 0.668 kPa) in a high altitude simulation facility. The motor chamber pressure measured in the low pressure cell (about 3.34 kPa) was corrected to that of a vacuum. The mechanism of the residual thrust is discussed. From the scale effect, the residal thrust of a large-scale motor corresponding to the H1-3rd stage motor is predicted from the results of these experiments.

514,295
N85-12088/9/GAR PC A02/MF A01
National Aerospace Lab., Tokyo (Japan).
Study on Dynamic Characteristics of Liquid Oxygen Pumps for Rocket Engines.
Abstract Only.
T. Shimura, and K. Kamijo. Apr 84, 11p NAL-TR-806
In Japanese; English Summary.

Transfer matrix methods, which were applied to cavitating inducers, are used in order to examine the dynamic response of a centrifugal liquid oxygen pump with an inducer. An ultrasonic flow meter is used to

measure the dynamic flow rate. A slit type perturbing valve is used to cause periodical oscillations in the pump flow. The major results of the present study are as follows: (1) Linearity of amplitude and phase exist in most parts of the experiment under high net positive suction head conditions; (2) The Z sub component of the pump transfer matrix was determined by two independent sets of data obtained by varying the helium gas volume in a vacuumjacketed cryogenic accumulator; and (3) The test results of the Z sub 12 component of the pump transfer matrix shows that dependency of Z sub 12 on frequency is small, and it was concluded that a quasistatic treatment of Z sub 12 is applicable on a centrifugal pump up to relatively high frequency regions.

514,296
N85-12089/7/GAR PC **A02/MF A01**
National Aeronautics and Space Administration, Washington, DC.
Lox/LH2 Propulsion System for Launch Vehicle Upper Stage, Test Results.
T. Ikeda, U. Imachi, Y. Yuzawa, Y. Kondo, and K. Miyoshi. Sep 84, 20p NAS 1.15:77727, REPT-2, NASA-TM-77727
Contract NASW-3541
Transl. into English from Ishikawajima-Harima Eng. Rev. (Japan), V. 23, Jul. 1983 p 377-382. Original Language Document Was Announced as A84-14102. Transl. by Kanner (Leo) Associates, Redwood City, CA.

The test results of small LOX/LH2 engines for two propulsion systems, a pump fed system and a pressure fed system are reported. The pump fed system has the advantages of higher performances and higher mass fraction. The pressure fed system has the advantages of higher reliability and relative simplicity. Adoption of these cryogenic propulsion systems for upper stage of launch vehicle increases the payload capability with low cost. The 1,000 kg thrust class engine was selected for this cryogenic stage. A thrust chamber assembly for the pressure fed propulsion system was tested. It is indicated that it has good performance to meet system requirements.

514,297
N85-12181/2/GAR PC **A02/MF A01**
National Aerospace Lab., Tokyo (Japan).
Catalyzed Low Burning Rate Propellants for Upper-Stage Solid Rocket Motor.
T. Niioka, T. Mitani, M. Takahashi, M. Izumikawa, and K. Kishi. Apr 84, 23p NAL-TR-805
In Japanese; English Summary.

Composite solid propellants catalyzed to lower the burning rate were investigated in this paper. To increase nozzle expansion ratio with a fixed rocket motor length, a smaller nozzle throat, and thus a lower-burning-rate propellant are needed for upper stage motors. A few types of catalysis were selected for experiments in consideration of their propellant flame structure: additives such as oxamide and urea considered for their effect on the solid-phase or decomposition flame of AP, additives such as alkali-metal and halogen compounds for their effect on the diffusion flame of released oxygen and fuel binder, and inert material such as aluminum oxide. Alkali-metal and halogen compounds had no effect on solid propellant, although they are well known as flame suppressants. Urea was the best for decreasing the burning rate, and the specific impulse decrease obtained by the chemical equilibrium calculation was the smallest, but there was a problem with its accommodation to the binder. In the end oxamide turned out to be the best synthetic additive. Utilizing the standard propellant (12%HTPB, 72%AP and 16%Al) and the propellant catalyzed by oxamide, 400 mm diameter spherical motors with aft-end igniter were made and demonstration firing tests were conducted.

514,298
N85-12318/0/GAR PC **A02/MF A01**
Rockwell International, Canoga Park, CA. Rocketdyne Div.
Methane Heat Transfer Investigation.
Technical Progress Narrative, 15 Aug. - 31 Oct. 1984.
R. T. Cook. 1 Nov 84, 23p NAS 1.26:171199, ASR84-72, NASA-CR-171199
Contract NAS8-34977

Future high chamber pressure LOX/hydrocarbon booster engines require copper-base alloy main combustion chamber coolant channels similar to the SSME to provide adequate cooling and resuable engine life. Therefore, it is of vital importance to evaluate the heat transfer characteristics and coking thresholds for LNG (94% methane) cooling, with a copper-base alloy material adjacent to the fuel coolant. High-pressure methane cooling and coking characteristics were recently evaluated using stainless-steel heated tubes at methane bulk temperatures and coolant wall temperatures typical of advanced engine operation except at lower heat fluxes as limited by the tube material. As expected, there was no coking observed. However, coking evaluations need be conducted with a copper-base surface exposed to the methane coolant at higher heat fluxes approaching those of future high chamber pressure engines.

22. SPACE TECHNOLOGY

22A. Astronautics

514,299
N85-11977/4/GAR PC **A03/MF A01**
Politecnico di Torino (Italy). Dept. of Aerospace Engineering.
Report of the Department of Aerospace Engineering.
Annual Report, 1983.
Apr 84, 40p

The objectives and activities in the department of aerospace engineering of the Twin Polytechnic Institute are outlined. Progress in research and development is reported. The areas of research include: (1) aeronautics and astronautics; (2) fluid dynamics and propulsion; (3) structures and materials; and (4) systems engineering and management.

514,300
N85-12075/6/GAR PC **A04/MF A01**
General Research Corp., McLean, VA.
Proceedings of a Workshop on Applications of Tethers in Space, Executive Summary.
Final Report.
1 Dec 83, 70p NAS 1.26:171195, NASA-CR-171195
Contract NAS8-35403
Proc. Held in Williamsburg, VA., 15-17 Jun. 1983.

The objectives were to identify potential applications for tethers in space; develop a first order assessment of the feasibility and benefits of tether applications; recommend future actions necessary to enable tether applications, including required technology advancements; and stimulate industry and government planners to consider the unique properties of tethers in designs for future missions.

514,301
N85-12076/4/GAR PC **A13/MF A01**
General Research Corp., McLean, VA.
Proceedings of a Workshop on the Applications of Tethers in Space, Volume 1.
Final Report.
1 Dec 83, 294p NAS 1.26:171196, NASA-CR-171196
Contract NAS8-35403
Proc. Held in Williamsburg, VA., 15-17 Jun. 1983.

Project overview; tether deployment; satellite system description; tether fundamentals; science applications; electrodynamic interactions; transportation; artificial gravity; and constellations; were described.

514,302
N85-12077/2/GAR PC **A14/MF A01**
General Research Corp., McLean, VA.
Proceedings of a Workshop on Applications of Tethers in Space, Volume 2.
Final Report.
1 Dec 83, 315p NAS 1.26:171197, NASA-CR-171197
Contract NAS8-35403
Proc. Held in Williamsburg, VA., 15-17 Jun. 1983.

The panel conclusions for each of the following panels (science applications; electrodynamic interactions; transportation applications; artificial gravity; constellations; and technology and test) are given.

514,303
N85-12079/8/GAR PC **A05/MF A01**
Computer Sciences Corp., Huntsville, AL.
STS Natural Environment Analysis.
Final Report, 1 Aug. - 30 Sep. 1984.
W. Batts. 7 Nov 84, 76p NAS 1.26:171221, NASA-CR-171221
Contract NAS8-35988

Climatological data sets to determine the risk of Shuttle landing delay for selected alternate landing sites were evaluated. Construction of a Shuttle ascent data tape using L-O atmospheric data for a specified Shuttle launch are reported.

22B. Spacecraft

514,304
N85-12078/0/GAR PC **A06/MF A01**
Royal Netherlands Aircraft Factories Fokker, Schiphol-Oost.
In-Orbit Experiments on IRAS for Application to the ISO Satellite.
Final Report.
L. Karsten, and E. Bongers. May 84, 118p FOK-TR-R-84-057, ESA-CR(P)-1917
Contract ESTEC-5623/83/NL-AN(SC)

In-orbit experiments on Infrared Astronomy Satellite (IRAS) studied the origin of thermal misalignment responsible for cross-scan attitude error developments up to 100 arcsec, and the effect of helium sloshing on IRAS attitude control performance. Misalignment is attributed to the Fine Sun Sensor brackets and satellite structure. The initial thermal misalignment model with two constants was loaded in the IRAS onboard computer. The in-flight performance of the model demonstrates the feasibility of onboard compensation. No evidence of slosh effects is found, even after a frequency analysis of flight data resulting from special slosh-evoking maneuvers.

514,305
N85-12082/2/GAR PC **A05/MF A01**
Communications Research Centre, Ottawa (Ontario).
Damping Synthesis for a Spacecraft Using Substructure and Component Data.
K. W. Lips, and F. R. Vigeron. Aug 84, 88p CRC-1365

A method for the synthesis of modal damping factors and other modal data for a spacecraft in orbit is demonstrated. It is based on input information at the component/substructure level. Also, the use of the method and the level of accuracy obtained is illustrated in a case study of the Hermes spacecraft. The synthesis procedure is demonstrated for a spacecraft configuration consisting of a central rigid body, solar array substructures, a momentum wheel and a liquid mercury damping device. The synthesized spacecraft modal data is obtained by eigenproblem analysis of a system model that is constructed from submodels of the components. The system modes are the natural (unconstrained) modes with damping and gyroscopic stiffness accounted for. Numerical experiments show that the procedure is not sensitive to errors in or to omission of damping factors of the higher order substructure modes. Damping factors for the nutational mode are confirmed by an independent analysis.

514,306
N85-12084/8/GAR PC **A06/MF A01**
Boeing Aerospace Co., Seattle, WA.

Definition of Technology Development Missions for Early Space Stations: Large Space Structures.
Final Report.
31 May 83, 106p NAS 1.26:171209, D180-27677-1, NASA-CR-171209
Contract NAS8-35043

The testbed role of an early (1990-95) manned space station in large space structures technology development is defined and conceptual designs for large space structures development missions to be conducted at the space station are developed. Emphasis is placed on defining requirements and benefits of development testing on a space station in concert with ground and shuttle tests.

514,307
N85-12085/5/GAR PC **A02/MF A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Verification Tests of Durable TPS Concepts.
J. L. Shideler, G. L. Webb, and C. M. Pittman. Sep 84, 12p NAS 1.15:86313, NASA-TM-86313
Previously Announced as A84-37493. Presented at the 19TH Aiaa Thermophys. Conf., Snowmass, Colo., 25-28.

Titanium multiwall, superalloy honeycomb, and Advanced Carbon-carbon (ACC) multipost Thermal Protection System (TPS) concepts are being developed to provide durable protection for surfaces of future space transportation systems. Verification tests including thermal, vibration, acoustic, water absorption, lightning strike, and aerothermal tests are described. Preliminary results indicate that the three TPS concepts are viable up to a surface temperature in excess of 2300 F.

514,308
N85-12200/0/GAR PC **A03/MF A01**
Astro Research Corp., Carpinteria, CA.
Large-Diameter Astromast Development.
Final Report.
L. A. Finley. 19 Jul 84, 43p NAS 1.26:171201, ARC-TN-1132, NASA-CR-171201
Contract NAS8-34547

The 15-m-long by 0.75-diameter deployable supermast was delivered. The performance characteristics, design parameters, and developmental work associated with this mast are described. The main differences, besides the length of these two mast sections, are a change in the longeron material (the principal structural member) to a circular cross section and the incorporation of a lanyard-bridle system which makes unaided deployment and retraction possible in zero gravity.

514,309
N85-12299/2/GAR PC **A10/MF A01**
Martin Marietta Aerospace, Denver, CO. Denver Div.
Power Subsystem Automation Study.
Final Report.
J. C. Tietz, D. Sewy, C. Pickering, and R. Sauers. Sep 84, 207p NAS 1.26:171213, MCR-84-596, NASA-CR-171213
Contract NAS8-34938

The purpose of the phase 2 of the power subsystem automation study was to demonstrate the feasibility of using computer software to manage an aspect of the electrical power subsystem on a space station. The state of the art in expert systems software was investigated in this study. This effort resulted in the demonstration of prototype expert system software for managing one aspect of a simulated space station power subsystem.

514,310
N85-12313/1/GAR PC **A06/MF A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Experimental and Predicted Heating Distributions for Biconics at Incidence in Air at Mach 10.
C. G. Miller. Nov 84, 118p NAS 1.60:2334, L-15785, NASA-TP-2334

Heating distributions were measured on a 1.9-percent-scale model of a generic aeroassisted vehicle proposed for missions to a number of planets and for use as a moderate lift-drag ratio Earth orbital transfer vehicle. This vehicle is spherically blunted, 12.84 deg/7 deg biconic with the fore-cone bent upward 7 deg to provide self-trim capability. A straight biconic with the same nose radius and the same half-angles was also tested. The free-stream Reynolds numbers based on model length were equal to about 2 x 10(5) or 9 x 10 (5). The angle of attack, referenced to the aft-cone, was varied from 0 deg to 20 deg. Heating distributions predicted with a parabolized Navier-Stokes (PNS) code are compared with the measurements for the present Reynolds numbers and range of angles of attack. Leeward heating was greatly affected by Reynolds number, with the heating increasing with decreasing Reynolds number for attached flow (low incidence). The opposite was true for separated flow, which occurred when the fore-cone angle of attack exceeded 0.8 times the fore-cone half-angle. Windward heating distributions were predicted to within 10 percent with the PNS code. Leeward heating distributions were predicted qualitatively for both Reynolds numbers, but quantitative agreement was poorer than on the windward side.

514,311
N85-12331/3/GAR PC **A04/MF A01**
Rockwell International, Canoga Park, CA. Rocketdyne Div.
Non-Intrusive Speed Sensor.
Final Report.
J. Maram, and L. Wyett. Oct 84, 60p NAS 1.26:171204, RI/RD84-232, NASA-CR-171204
Contract NAS8-34658

A computerized literature search was performed to identify candidate technologies for remote, non-intrusive speed sensing applications in Space Shuttle Main Engine (SSME) turbopumps. The three most promising technologies were subjected to experimental evaluation to quantify their performance characteristics under the harsh environmental requirements within the turbopumps. Although the infrared and microwave approaches demonstrated excellent cavitation immunity in laboratory tests, the variable-source magnetic speed sensor emerged as the most viable approach. Preliminary design of this speed sensor encountered no technical obstacles and resulted in viable and feasible speed nut, sensor housing, and sensor coil designs.

514,312
N85-12586/2/GAR PC **A08/MF A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
User's Guide to the Flexible Spacecraft Dynamics and Control Program.
J. V. Fedor. Jul 84, 151p NAS 1.15:87389, X-712-84-6, NASA-TM-87389

A guide to the use of the Flexible Spacecraft Dynamics Program (FSD) is presented covering input requirements, control words, orbit generation, spacecraft description and simulation options, and output definition. The program can be used in dynamics and control analysis as well as in orbit support of deployment and control of spacecraft. The program is applicable to inertially oriented spinning, Earth oriented or gravity gradient stabilized spacecraft. Internal and external environmental effects can be simulated.

22D. Spacecraft Launch Vehicles and Ground Support

514,313
N85-12071/5/GAR PC **A15/MF A01**
Battelle Columbus Labs., OH.
Preliminary Analysis of Space Mission Applications for Electromagnetic Launchers.
Final Technical Report.
L. A. Miller, E. E. Rice, R. W. Earhart, and R. J. Conion. 30 Aug 84, 326p NAS 1.26:174067, NASA-CR-174067
Contract NAS3-23354

The technical and economic feasibility of using electromagnetically launched EML payloads propelled from the Earth's surface to LEO, GEO, lunar orbit, or to interplanetary space was assessed. Analyses of the designs of rail accelerators and coaxial magnetic accelerators show that each is capable of launching to space payloads of 800 KG or more. A hybrid launcher in which EML is used for the first 2 KM/sec followed by chemical rocket stages was also tested. A cost estimates study shows that one to two EML launches per day are needed to break even, compared to a four-stage rocket. Development models are discussed for: (1) Earth orbital missions; (2) lunar base supply mission; (3) solar system escape mission; (4) Earth escape missions; (5) suborbital missions; (6) electromagnetic boost missions; and (7) space-based missions. Safety factors, environmental impacts, and EML systems analysis are discussed. Alternate systems examined include electrothermal thrustors, an EML rocket gun; an EML theta gun, and Soviet electromagnetic accelerators.

KEYWORD INDEX

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Delayed Immunologic Effects of Low Dose Radiation in Japanese A-Bomb Survivors. Technical Progress Report.
DE85001943/GAR *513,054*

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Using an Audio Cassette and Workbook for Group Training.
ED-246 859 *512,799*

ABSORPTION SPECTRA
Simultaneous Measuring Absorption Spectrometer.
N85-12339/6/GAR *513,920*

Rydberg Series 5p(sup 6) 6snd in the Autoionizing Continua of Neutral Cesium.
PB85-143949 *513,297*

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Academic Freedom and Faculty Status for Academic Librarians: A Bibliographical Essay,
ED-246 917 *512,967*

ACADEMIC RANK (PROFESSIONAL)
Academic Freedom and Faculty Status for Academic Librarians: A Bibliographical Essay,
ED-246 917 *512,967*

ACCESS TO EDUCATION
School Uses of Microcomputers: Reports from a National Survey. Issue No. 5.
ED-246 886 *512,949*

ACCESS TO INFORMATION
Comprehensive Plan for Library Service in Pennsylvania. Recommendations for Improved Access to Library Resources in Pennsylvania.
ED-246 900 *512,800*

Public/Private Sector Interactions: The Implications for Networking. A Discussion Report Prepared by the Network Advisory Committee.
ED-246 905 *512,802*

Collection Access Policy,
ED-246 908 *512,805*

Legislative Report of the ALA Washington Office, January-June 1984.
ED-246 911 *512,963*

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Accessibility and Public Transport Use.
PB85-139673/GAR *513,773*

ACCIDENT INVESTIGATIONS
Aircraft Accident Report - Pilgrim Airlines, Inc., Fokker F27-100, N148PM, John F. Kennedy International Airport, Jamaica, New York, January 13, 1984.
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PB85-147338 *512,755*

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Development of Reference Materials for Acid Rain Research.
PB85-148039 *513,324*

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PB85-141315/GAR *513,125*

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Acoustic Emission Monitoring of Fatigue in 7010 Aluminum Alloys.
N85-12152/3/GAR *513,601*

ACOUSTIC EMISSION TESTING
Nondestructive Testing: Acoustic Emission Techniques and Equipment. May 1982-January 1985 (Citations from the Metals Abstracts Data Base).
PB85-854222/GAR *513,954*

Non-Ultrasonic Acoustic Nondestructive Testing. 1975-January 1985 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
PB85-854651/GAR *513,955*

ACOUSTIC MEASUREMENT
Acoustic Radiation from Single and Double Ribbed Circular Cylindrical Shells.
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ADA Programming Language. March 1983-1984 (Citations from the INSPEC: Information Services for the Physics and Engineering Communities Data Base).
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World Oilseed Situation and U.S. Export Opportunities, November 1984: Reference Tables on the Major Producing, Consuming, and Trading Countries of Cottonseed, Cottonseed Meal and Oil.
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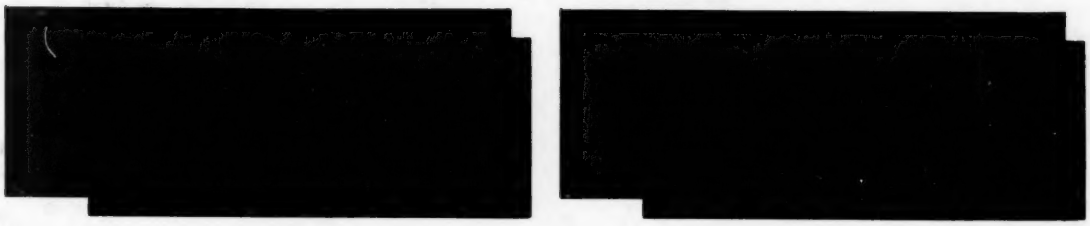

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California Univ., Berkeley.
DE85002337/GAR *514,215*

AT03-84ER51044
GA Technologies, Inc., San Diego, CA.
DE85000449/GAR *513,991*
DE85002252/GAR *514,214*

AT06-76EV70040
Washington Univ., Seattle. Dept. of Oceanography.
DE85001682/GAR *513,718*
DE85001683/GAR *513,719*
DE85001684/GAR *513,340*

DA PROJ. 1L1-62209-AH-76
Texas A and M Univ., College Station.
N85-12315/6/GAR *514,269*

DAAE07-82-C-4109
Garrett Turbine Engine Co., Phoenix, AZ.
AD-A148 594/5/GAR *514,038*

DAAG29-78-G-0091
National Bureau of Standards, Gaithersburg, MD.
PB85-144954 *513,678*

DAAG29-82-C-0012
National Research Council, Washington, DC. Committee on Demilitarizing Chemical Munitions and Agents.
AD-A148 584/6/GAR *513,958*

DAAG29-82-K-0031
National Bureau of Standards, Gaithersburg, MD.
PB85-148062 *513,325*

DAAG29-82-K-0056
Stanford Univ., CA. Lab. for Computational Statistics.
AD-A148 677/8/GAR *513,641*
AD-A148 678/6/GAR *513,642*

DAAG29-84-C-0045
Software Architecture and Engineering, Inc., Arlington, VA.
AD-A148 789/1/GAR *513,429*

DAAG29-84-K-0058
Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
AD-A148 696/8/GAR *513,680*

DAAG46-78-C-0007
LTV Aerospace and Defense Co., Dallas, TX. Vought Missiles Advanced Program Div.
AD-A148 808/9/GAR *513,909*

DAAG53-76-C-0138
Maryland Univ., College Park. Computer Science Center.
AD-A148 631/5/GAR *513,416*

DAAK70-84-C-0030
Daedalean Associates, Inc., Woodbine, MD.
AD-A148 717/2/GAR *513,885*

DACW01-84-C-0068
Birmingham Historical Society, AL.
AD-A148 744/6/GAR *512,855*

DACW21-84-M-0314
Southeastern Archeological Services, Inc., Athens, GA.
AD-A148 602/6/GAR *512,851*

DACW39-79-C-0038
URS Co., Seattle, WA.
AD-A148 815/4/GAR *513,713*

DACW41-77-M-1672
Iowa State Historical Dept., Iowa City. Div. of Historic Preservation.
AD-A148 796/6/GAR *512,858*

DACW41-78-C-0054
Iroquois Research Inst., Fairfax, VA.
AD-A148 690/1/GAR *512,852*

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DACW45-78-C-1036
Nebraska Univ.-Lincoln. Div. of Archeological Research.
AD-A148 719/8/GAR 512,854
AD-A148 781/8/GAR 512,856
AD-A148 782/6/GAR 512,857

DACW46-83-M-2506
Arkansas Univ., Fayetteville. Dept. of Anthropology.
AD-A148 715/6/GAR 512,853

DAJA37-82-A-0116
University of Wales Inst. of Science and Technology, Cardiff. Dept. of Physics, Electronics, an Electrical Engineering.
AD-A148 710/7/GAR 514,237
AD-A148 720/6/GAR 514,238
AD-A148 722/2/GAR 514,240

DAJA37-82-C-0116
University of Wales Inst. of Science and Technology, Cardiff. Dept. of Physics, Electronics, an Electrical Engineering.
AD-A148 721/4/GAR 514,239
AD-A148 723/0/GAR 514,241

DAJA37-82-C-0177
Cambridge Univ. (England). Dept. of Engineering.
AD-A148 741/2/GAR 513,395
AD-A148 742/0/GAR 513,710
AD-A148 743/8/GAR 513,711

DAJA45-84-M-0251
International Society for Terrain-Vehicle Systems.
AD-A148 634/9/GAR 513,789
AD-A148 635/6/GAR 513,790

DAMD17-74-C-4051
Hahnemann Univ. School of Medicine, Philadelphia.
AD-A148 691/9/GAR 513,021

DAMD17-75-C-5036
Bio-Med, Inc., College Park, MD.
AD-A148 734/7/GAR 513,171
AD-A148 763/6/GAR 513,172
AD-A148 820/4/GAR 513,173

DAMD17-79-C-9050
Peter Bent Brigham Hospital, Boston, MA.
AD-A148 605/9/GAR 513,040
AD-A148 606/7/GAR 513,041
AD-A148 607/5/GAR 513,042

DAMD17-79-C-9134
Hahnemann Medical Coll. and Hospital, Philadelphia, PA.
AD-A148 613/3/GAR 513,020
Hahnemann Univ. School of Medicine, Philadelphia.
AD-A148 691/9/GAR 513,021

DAMD17-79-C-9146
Illinois Univ. at the Medical Center, Chicago. Dept. of Medicinal Chemistry.
AD-A148 648/9/GAR 513,166
AD-A148 649/7/GAR 513,167

DAMD17-80-C-0166
New Jersey Medical School, Newark.
AD-A148 642/8/GAR 513,050

DAMD17-80-G-9486
University of Western Ontario, London. Dept. of Biochemistry.
AD-A148 788/3/GAR 513,187

DAMD17-81-C-1026
Yale Univ., New Haven, CT.
AD-A148 603/4/GAR 513,030
AD-A148 604/2/GAR 513,031

DAMD17-81-C-1044
Saint Louis Univ., MO.
AD-A148 643/0/GAR 513,192
AD-A148 644/8/GAR 513,193

DAMD17-81-C-1158
Yale Univ., New Haven, CT. School of Medicine.
AD-A148 647/1/GAR 513,044

DAMD17-81-C-1170
Yale Univ., New Haven, CT. Dept. of Surgery.
AD-A148 651/3/GAR 513,169
Yale Univ., New Haven, CT. School of Medicine.
AD-A148 650/5/GAR 513,168

DAMD17-81-C-1191
Maryland Univ., Baltimore.
AD-A148 609/1/GAR 513,043

DAMD17-81-C-1196
Albert Einstein Coll. of Medicine, Bronx, NY.
AD-A148 812/1/GAR 513,048

DAMD17-82-G-9506
Helsinki Univ. (Finland).
AD-A148 760/2/GAR 513,162

DAMD17-83-G-9542
International Narcotic Research Conference.
AD-A148 683/6/GAR 513,170

DARPA ORDER-3206
Maryland Univ., College Park. Computer Science Center.
AD-A148 631/5/GAR 513,416

DARPA ORDER-4114
BDM Corp., Vienna, VA.
AD-A148 804/8/GAR 513,852

DE-A101-76PR06010
National Bureau of Standards (NEL), Gaithersburg, MD. Center for Building Technology.
PB85-146868/GAR 513,490

DE-AC02-76CH00016
Brookhaven National Lab., Upton, NY.
NUREG/CR-3518-V2/GAR 512,993

DE-AC02-79ER10396
National Bureau of Standards, Gaithersburg, MD.
PB85-141992 513,273

DE-AC04-76DP00789
Sandia National Labs., Albuquerque, NM.
NUREG/CR-3923/GAR 514,026

DE-AC05-84OR21400
Oak Ridge National Lab., TN.
DE81027154/GAR 514,007

DE-AC06-76RL0-1830
Battelle Pacific Northwest Labs., Richland, WA.
NUREG/CR-3809-V1/GAR 513,189

DE-AI01-80CS-50194
Mechanical Technology, Inc., Latham, NY.
N85-12606/0/GAR 514,291

DE-AI04-80AL-12726
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
N85-12465/9/GAR 513,253

DEN3-309
Mechanical Technology, Inc., Latham, NY.
N85-12606/0/GAR 514,291

DHHS-100-79-0117
Denver Research Inst., CO. Social Systems Research and Evaluation Div.
SHR-0010567/GAR 513,086
SHR-0010583/GAR 513,087
SHR-0010605/GAR 512,842
SHR-0012170/GAR 513,465

DL-20-24-82-10
Booz-Allen and Hamilton, Inc., Bethesda, MD.
PB85-136737/GAR 512,977

DL-20-24-82-11
MACRO Systems, Inc., Silver Spring, MD.
PB85-138519/GAR 512,981

DNA001-80-C-0140
Mission Research Corp., Albuquerque, NM.
AD-A148 775/0/GAR 513,470

DNA001-81-C-0283
Historical Evaluation and Research Organization, Dunn Loring, VA.
AD-A148 773/5/GAR 513,964

DNA001-82-C-0024
Kaman Tempo, Santa Barbara, CA.
AD-A148 772/7/GAR 513,973

DNA001-82-C-0119
Georgetown Univ., Washington, DC. Center for Strategic and International Studies.
AD-A148 776/8/GAR 512,845

DOE-EA-77-A-01-6010
National Bureau of Standards, Gaithersburg, MD.
PB85-142461 513,875
PB85-148500 513,953

DOT-FH-11-9489
Resource International, Inc., Worthington, OH.
PB85-137230/GAR 513,746

DOT-HS-9-02209
Michigan Univ., Ann Arbor. Transportation Research Inst.
PB85-136568/GAR 513,880

DOT-UMTA-CA-11-0027
California Univ., Irvine. Inst. of Transportation Studies.
PB85-135697/GAR 513,732
PB85-135705/GAR 513,733

DOT-UMTA-IN-11-0009
Indiana Univ. at Bloomington. Center for Transit Research and Management Development.
PB85-136414/GAR 513,445

DOT-UMTA-VA-11-0013
Virginia Polytechnic Inst. and State Univ., Blacksburg.
PB85-138857/GAR 512,982
PB85-138865/GAR 512,983
PB85-138873/GAR 512,984

DRET-81.341.83.00
Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
N85-12102/8/GAR 513,548

DT-FA01-83-Y-10554
Computer Technology Associates, Inc., Englewood, CO.
AD-A148 813/9/GAR 512,860

DTFH61-80-C-00175
Rauhut (Brent) Engineering, Inc., Austin, TX.
PB85-138956/GAR 513,783
PB85-138964/GAR 513,784
PB85-138972/GAR 513,785
PB85-138980/GAR 513,786

DTFH61-83-C-00082
Mandex, Inc., Vienna, VA.
PB85-139606/GAR 513,845

DTNH22-80-R-07622
Texas Transportation Inst., College Station.
PB85-136303/GAR 513,842

DTNH22-83-C-07257
Westat, Inc., Rockville, MD. Research Div.
PB85-134997/GAR 513,877

DTNH22-83-C-07334
Carlow Associates, Inc., Fairfax, VA.
PB85-135820/GAR 513,688

EPA-R-801936
Michigan State Univ., Hickory Corners. W.K. Kellogg Biological Station.
PB85-136220 513,259

EPA-68-02-2216
Systems Applications, Inc., San Rafael, CA.
PB85-137362/GAR 513,748
PB85-137370/GAR 513,749
PB85-137388/GAR 513,750

EPA-68-02-3938
Midwest Research Inst., Kansas City, MO.
PB85-138535/GAR 513,756

EPA-68-03-2968
Union Carbide Corp., Tonawanda, NY. Linde Div.
PB85-137347/GAR 513,258

EPA-68-03-3001
Little (Arthur D.), Inc., Cambridge, MA.
PB85-138899/GAR 513,762

EPA-68-03-3016
WWI Consulting Engineers, Emeryville, CA.
PB85-138634/GAR 513,759

ESTEC-5563/83/NL-BS
Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (Germany, F.R.). Unternehmensbereich Raumfahrt.
N85-12081/4/GAR 513,975

ESTEC-5623/83/NL-AN(SC)
Royal Netherlands Aircraft Factories Fokker, Schiphol-Oost.
N85-12078/0/GAR 514,304

F04701-83-0084
Aerospace Corp., El Segundo, CA. Electronics Research Lab.
AD-A148 694/3/GAR 513,972

F04701-83-C-0084
Aerospace Corp., El Segundo, CA. Space Sciences Lab.
AD-A148 628/1/GAR 512,780
AD-A148 791/7/GAR 513,623

F08606-84-C-0009
Teledyne Geotech, Alexandria, VA. Alexandria Labs.
AD-A148 765/1/GAR 513,995

F08635-80-C-0359
California Univ., Riverside. Statewide Air Pollution Research Center.
AD-A148 716/4/GAR 512,761

F30602-79-C-0265
General Research Corp., Santa Barbara, CA.
AD-A148 732/1/GAR 513,423

F30602-81-C-0259
Harris Corp., Melbourne, FL.
AD-A148 679/4/GAR 513,969

F30602-81-K-0176
SRI International, Menlo Park, CA. Computer Science Lab.
AD-A148 733/9/GAR 513,424

F33615-80-C-5191
Hughes Aircraft Co., Torrance, CA. Electron Dynamics Div.
AD-A148 810/5/GAR 513,400

F33615-80-D-4006
Weston (Roy F.), Inc., West Chester, PA.
AD-A148 687/7/GAR 513,707

F33615-82-C-5020
Southwest Research Inst., San Antonio, TX.
AD-A148 757/8/GAR 514,266

F33615-83-C-2372
Spectron Development Labs., Inc., Costa Mesa, CA.
AD-A148 684/4/GAR 513,903

F33615-83-K-0038
Ohio State Univ., Columbus.
AD-P004 333/1/GAR *512,900*
Ohio State Univ. Research Foundation, Columbus.
AD-A148 718/0/GAR *512,987*

F49620-77-C-0087
Rockwell International, Thousand Oaks, CA. Electronics Research Center.
AD-A148 682/8/GAR *513,851*

F49620-80-C-0065
California Univ., Berkeley. Dept. of Mechanical Engineering.
AD-A148 802/2/GAR *514,267*

F49620-81-C-0007
California Univ., San Francisco.
AD-A148 798/2/GAR *513,232*

F49620-81-C-0028
Exxon Research and Engineering Co., Linden, NJ. Corporate Research-Technology Feasibility Center.
AD-A148 758/6/GAR *514,265*

F49620-82-C-0009
North Carolina Univ. at Chapel Hill. Dept. of Statistics.
AD-A148 622/4/GAR *513,640*

F49620-82-K-0006
EEG Systems Lab., San Francisco, CA.
AD-A148 809/7/GAR *512,988*

F49620-83-C-0114
Ohio State Univ. Research Foundation, Columbus.
AD-A148 837/8/GAR *513,049*

F49620-84-C-0069
University of Southern California, Los Angeles. Dept. of Electrical Engineering.
AD-A148 770/1/GAR *513,468*

FDA-223-74-2224
Flavor and Extract Manufacturers' Association of the United States, Washington, DC.
PB85-141059/GAR *513,099*
PB85-141067/GAR *513,100*
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PB85-141307/GAR *513,124*

FG02-84ER45061
Utah Univ., Salt Lake City.
DE85000868/GAR *514,058*

FG02-84ER45096
State Univ. of New York at Stony Brook. Dept. of Materials Science and Engineering.
DE85000416/GAR *513,576*

FG05-80ET53088
Oak Ridge National Lab., TN.
DE85002175/GAR *514,212*
Texas Univ. at Austin. Inst. for Fusion Studies.
DE85002174/GAR *514,211*
DE85002176/GAR *514,213*

FOA-304178
Uppsala Ionospheric Observatory (Sweden).
N85-12294/3/GAR *513,979*

GRI-5014-353-0160
Massachusetts Inst. of Tech., Cambridge. Dept. of Chemical Engineering.
PB85-148468/GAR *514,277*

GRI-5060-353-0422
National Bureau of Standards, Gaithersburg, MD.
PB85-141489 *513,933*

GRI-5081-260-0538
Northwestern Univ., Evanston, IL.
PB85-149771/GAR *513,629*

GRI-5082-241-0715
Battelle Columbus Labs., OH.
PB85-149847/GAR *513,701*

GRI-5082-252-0719
Little (Arthur D.), Inc., Cambridge, MA.
PB85-149755/GAR *514,278*

GRI-5082-260-0617
Southern Illinois Univ. at Carbondale.
PB85-149839/GAR *514,282*

GRI-5082-260-0666
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PB85-148476/GAR *513,331*

GRI-5082-512-0622
Energy and Environmental Analysis, Inc., Arlington, VA.
PB85-149763/GAR *513,466*
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Advanced Mechanical Technology, Inc., Newton, MA.
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Brookhaven National Lab., Upton, NY.
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GRI-5083-260-0827
North Carolina Univ., Chapel Hill.
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Bonner and Moore Management Science, Houston, TX.
PB85-147718/GAR *514,276*

ITA-99-26-07123-30
Luggage and Leather Goods Manufacturers of America, Inc., New York.
PB85-137008/GAR *512,831*
PB85-137016/GAR *512,832*
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J0205045
Martin Consultants, Inc., Golden, CO.
PB85-139954/GAR *513,383*

MDA903-77-C-0189
Oregon State System of Higher Education, Monmouth.
AD-A148 590/3/GAR *512,864*

MDA903-80-C-0147
Young (Arthur) and Co., Washington, DC.
AD-A148 638/0/GAR *512,867*
AD-A148 640/6/GAR *512,869*

MDA903-81-C-0166
Logistics Mangement Inst., Bethesda, MD.
AD-A148 652/1/GAR *512,783*
AD-A148 653/9/GAR *513,959*

MDA903-82-C-0169
Interamerica Research Associates, Inc., Rosslyn, VA.
AD-A148 639/8/GAR *512,868*

MDA903-82-C-0269
General Research Corp., McLean, VA.
AD-A148 642/2/GAR *512,870*

MDA903-83-C-0475
Science Applications International Corp., McLean, VA.
AD-A148 641/4/GAR *512,850*

MDA903-84-C-0031
Institute for Defense Analyses, Alexandria, VA.
AD-A148 774/3/GAR *513,426*

MDA903-84-C-0039
BDM Corp., Vienna, VA.
AD-A148 804/8/GAR *513,852*

N01-ES-2-5014
Research Triangle Inst., Research Triangle Park, NC.
PB85-137073/GAR *513,202*
PB85-137123/GAR *513,203*

N00014-74-C-0262
Woods Hole Oceanographic Institution, MA.
AD-A148 697/6/GAR *513,347*

N00014-75-C-0265
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Metallurgical Engineering and Materials Science.
AD-A148 610/9/GAR *513,556*

N00014-76-C-0037
Michigan Technological Univ., Houghton. Dept. of Metallurgical Engineering.
AD-A148 670/3/GAR *513,557*
AD-A148 671/1/GAR *513,558*
AD-A148 672/9/GAR *513,559*
AD-A148 766/9/GAR *513,560*

N00014-76-C-1070
California Inst. of Tech., Pasadena. Seismological Lab.
AD-A148 589/5/GAR *513,357*

N00014-77-C-0412
Stanford Univ., CA. Edward L. Ginzton Lab. of Physics.
AD-A148 755/2/GAR *513,905*

N00014-79-C-0044
Indiana Univ. at Bloomington. Dept. of Chemistry.
AD-A148 811/3/GAR *513,234*
AD-A148 814/7/GAR *513,235*

N00014-79-C-0071
Woods Hole Oceanographic Institution, MA.
AD-A148 697/6/GAR *513,347*

N00014-79-C-0632
Texas Christian Univ., Fort Worth. Dept. of Chemistry.
AD-A148 803/0/GAR *513,213*

N00014-80-C-0555
Yale Univ., New Haven, CT. School of Organization and Management.
AD-A148 681/0/GAR *512,872*

N00014-81-C-0046
United Technologies Research Center, East Hartford, CT.
AD-A148 801/4/GAR *514,266*

N00014-81-C-0375
Radian Corp., McLean, VA.
AD-A148 709/9/GAR *514,048*

N00014-81-C-0756
New Hampshire Univ., Durham. Marine Systems Engineering Lab.
AD-A148 794/1/GAR *513,872*

N00014-81-K-0340
Stanford Univ., CA. Lab. for Computational Statistics.
AD-A148 833/7/GAR *513,650*

N00014-82-C-0164
Westinghouse Research and Development Center, Pittsburgh, PA.
AD-A148 618/2/GAR *513,901*
AD-A148 619/0/GAR *513,902*

N00014-82-C-0374
California Univ., San Diego, La Jolla.
AD-A148 593/7/GAR *513,966*

N00014-82-K-0337
North Carolina Univ. at Chapel Hill. Dept. of Chemistry.
AD-A148 597/8/GAR *513,215*

N00014-82-K-0487
Georgia Inst. of Tech., Atlanta. School of Industrial and Systems Engineering.
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N00014-82-K-0696
Wayne State Univ., Detroit, MI. Dept. of Chemistry.
AD-A148 727/1/GAR *513,229*

N00014-83-K-0018
Institute for Medical Research, San Jose, CA.
AD-A148 592/9/GAR *513,039*

N00014-83-K-0125
Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
AD-A148 696/8/GAR *513,680*
AD-A148 707/3/GAR *513,421*
AD-A148 730/5/GAR *513,422*

N00014-83-K-0470
Utah Univ., Salt Lake City. Dept. of Chemistry.
AD-A148 654/7/GAR *513,216*
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AD-A148 667/9/GAR *513,228*

N00014-83-K-0472
Stanford Univ., CA. Lab. for Computational Statistics.
AD-A148 677/8/GAR *513,641*
AD-A148 678/6/GAR *513,642*
AD-A148 833/7/GAR *513,650*

N00014-84-C-0180
Science Applications, Inc., McLean, VA.
AD-A148 596/0/GAR *514,049*

N00014-84-C-0742
Astron Research and Engineering, Mountain Valley, CA.
AD-A148 688/5/GAR *514,043*

N00014-84-K-0049
Colorado School of Mines, Golden. Center for Wave Phenomena.
AD-A148 686/9/GAR *513,389*

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Hughes Research Labs., Malibu, CA.
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AD-A148 611/7/GAR 513,900
AD-A148 771/9/GAR 514,050

N61339-83-C-0056
KFC Associates, Inc., Wyckoff, NJ.
AD-P004 326/1/GAR 512,895

N62269-82-M-3306
Duke Univ. Medical Center, Durham, NC. Dept. of Ophthalmology.
AD-A148 646/3/GAR 513,180

NA-81AA-D-00094
University of Southern California, Los Angeles. Inst. for Marine and Coastal Studies.
PB85-135051/GAR 512,973

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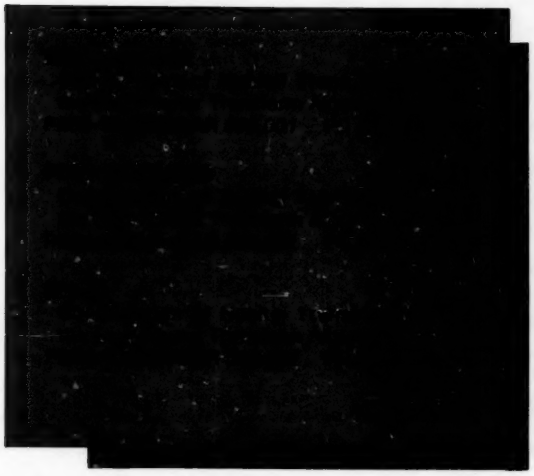

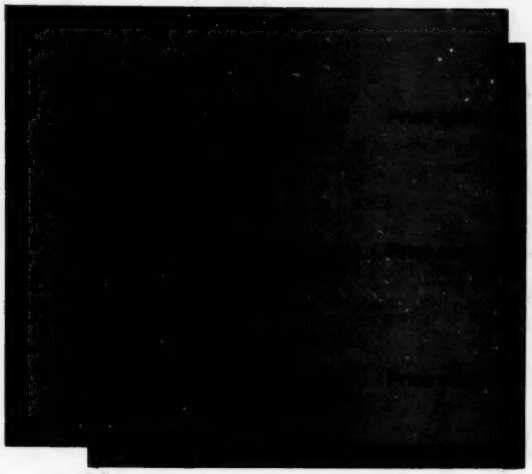

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